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CONTENTS

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IN THIS ISSUE

TODAY, two-thirds of all deaths among persons between 20 and 65 years of age are due to the chronic diseases. These diseases, frequently accompanied by disability and premature death, are demanding consideration as leading medical, social, and public health problems. That the chronic diseases cast their shadow before them is revealed in the article "Risk of Mortality among Persons with Chronic Disease" by Rollo H. Britten, Senior Statistician of the United States Public Health Service. He finds that persons in comparatively good health who on medical examination are found to have specific impairments or a history of certain diseases have an added risk of mortality. The material presented in this study indicates the need for study of two aspects of the problem of control; how to identify the signs of chronic disease at the earliest possible moment, and how to eliminate the associated risk of mortality.

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Better control of tuberculosis is the constant aim of public health workers engaged in combatting the disease. With this purpose in mind a special tuberculosis program is being conducted in one of the congested areas of New York City. A critical appraisal of the results of the first two years of this intensive study is contained in the article, "Tuberculosis Control in the Mulberry District of New York City," by Jean Downes and Clara R. Price. The comparative value of various experiments in case-finding is discussed, volume of service in relation to cost is analyzed, and the accomplishment in certain procedures for control, such as examination of family contacts and the extent of clinic and nursing supervision, is tested. The Fund is cooperating in this special study which is being conducted by the Association for Improving the Condition of the Poor and the Bureau of Tuberculosis of the New York City Department of Health.

The extent to which maturing adults replace the existing segment of the population of working ages is fundamental to many of our current problems. It has obvious bearing on questions of future labor supply, demand for housing and other commodities. It is immediately pertinent to the rural youth problem, for young men and women attaining their majorities on the farm must find opportunities there, or migrate to the cities. As Coordinator of Rural Research for the Works Progress Administration, Dr. T. J. Woofer, Jr., has constantly needed accurate predictions with reference to the course of the problems mentioned above. This need is not fulfilled by the ordinary estimates of total increase in population. In "Replacement Rates in the Productive Ages," Dr. Woofter submits what he believes to be a fairly accurate method of measuring and forecasting this situation. In this article, chief consideration is given to present and projected replacement rates of rural farm males 18-65 years of age in different sections of the country. For the whole country the author compares the projected trends 1935-1955 for males 18-65 in urban, rural nonfarm, and rural farm populations.

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A pioneer attempt to appraise health teaching activities in elementary schools is described in the article "Evaluation of a Rural School Health Project," by Ruth M. Strang, Ruth E. Grout, and Dorothy G. Wiehl. For this study of the teacher's work in health education, certain significant aspects of health instruction were formulated as a basis for rating an individual teacher's methods. The immediate purpose of this evaluation of teaching activities was to obtain some measure of the effectiveness of specialized supervision in the development of a sound program of health instruction in the one and two teacher rural schools in Cattaraugus County, New York. The methods applied, however, should be useful to supervisors and others who may be concerned with the problem of rating teachers' reports of their health work. This investigation gives evidence of the rural teacher's need for education in methods of teaching health information and of utilizing her opportunities for developing in the child habits of healthful living.

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Under the title "Impairments in a Rural Population" is offered the second article on the health status of people in a typical rural area. The present note takes up the prevalence of impairments (chronic illnesses

and defects) which could only be diagnosed by the history obtained from the examined individuals. These impairments are kept separate from the impairments ascertained from other parts of the medical study (physical and laboratory examinations) because they lack an objective basis. Despite this handicap, however, they are felt to offer more reliable data on prevalence than the more frequently given estimates.

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Ten years ago modern medicine, except as provided in the missionary hospitals, was a curiosity in the rural sections of China, and public health work was unknown. For more than a thousand years, the great mass of the Chinese people had lived together in villages which were merely agglomerations of farming families held together by ownership of land, common ancestry, and the simplest form of democratic government. Over 90 per cent were illiterate and even the so-called middle classes kept their domestic animals in the quarters where they slept, cooked, and ate. In 1927, the Chinese National Association of the Mass Education Movement, which since 1923 had been carrying on a program of large scale mass education to reduce illiteracy, decided to engage in an intensive "qualitative" experiment in public health, agricultural extension, industrial education, social surveys, and research in methods of teaching. An experimental unit was set up in Ting Hsien, a remote farming community of some 400,000 population about 130 miles southwest of Peiping. The annual report of the Department of Public Health for 1936, "Ting Hsien and the Public Health Movement in China," describing the vast strides made since 1930 in introducing public health work to rural China, is published in this issue.

RISK OF MORTALITY AMONG PERSONS WITH CHRONIC DISEASE

by ROLLO H. BRITTEN[1]

I

WITH continuously decreasing mortality for infants, children, and young adults, the more complex and difficult problem of the chronic diseases forces itself on our attention. Even in the prime of life, illness and mortality from these conditions have become of first importance. Two-thirds of all deaths among persons between 20 and 65 years of age are today due to such diseases, which are thus not simply the result of the wearing out of the body after a complete life has been lived. We must also keep in mind the vast economic effects on the family of long-continued illness, especially where the disabled person is a wage-earner.

The problem of combatting chronic diseases is very different from the customary public health procedures against acute communicable diseases. Mass methods are not equally effective, and for this reason the knowledge necessary is broader in scope and has not been developed to the same degree. Research must be stimulated in a large number of fields. Furthermore, there must be a piecing together of such information as is now available from many sources, and this body of facts must be brought within reach of public health, medical, and sociological experts. Let this be the justification for presenting a further[2] summary of a type of information which has a direct bearing on the problem of chronic disease—namely, the record of subsequent mortality among persons found

[1] Senior Statistician, Division of Public Health Methods, National Institute of Health, United States Public Health Service. Acknowledgment is made to Arthur Hunter, chairman, Joint Committee on Mortality, Association of Life Insurance Medical Directors and the Actuarial Society of America, and to Walter G. Bowerman, in charge of the Central Bureau of the Joint Committee, for their kind review of this paper.

[2] Britten, Rollo H.: The Physical Impairments of Adult Life: Association with Subsequent Rates of Mortality. *The Journal of Preventive Medicine*, July, 1932, 6, No. 4, pp. 249-272.

to have or giving a history of certain physical impairments on application for life insurance. Such information will give some conception of the specific diseases or impairments associated with high rates of mortality later on in life, and direct attention to methods of identifying the signs of these diseases in the individual at the earliest possible moment.

The studies which have made practicable this analysis are those conducted by the Joint Committee on Mortality of the Actuarial Society of America and the Association of Life Insurance Medical Directors. The purpose of these studies has been that of facilitating the revision by insurance companies of premium rates for persons substandard on account of medical defect. But what is of interest to public health workers is the basic information thus obtained on the subsequent rates of mortality among persons with certain specific impairments, the duration of any excess mortality found, and the causes of death.

The first major study of this kind was that known as the Medico-Actuarial Mortality Investigation of 1912.[3] The results had a profound effect on insurance practice and also extended our knowledge of the relation between disease and the chance of death. After the adoption of a standard medical impairment code in 1925,[4] a study was made of the risk of mortality in various occupations.[5] Next a continuation of the type of research of 1912-1914 was undertaken.[6] [7] This last year a further publication[8] dealt with certain

3 The Medico-Actuarial Mortality Investigation, prepared by the Joint Committee on Mortality of the Actuarial Society of America and the Association of Life Insurance Medical Directors. 5 Vols. 1912-1914.

4 Medical Impairment Code and Description of Mortality Cards, by the Joint Committee on Mortality of the Association of Life Insurance Medical Directors and the Actuarial Society of America. 1925.

5 Joint Occupation Study: 1928, compiled and published by the Actuarial Society of America and the Association of Life Insurance Medical Directors.

6 Medical Impairment Study, compiled and published by the Actuarial Society of America and the Association of Life Insurance Medical Directors. 1929.

7 Supplement to Medical Impairment Study, compiled and published by the Actuarial Society of America and the Association of Life Insurance Medical Directors. 1929.

8 Impairment Study, 1936, compiled and published by the Actuarial Society of America and the Association of Life Insurance Medical Directors.

diagnosis groups insufficiently represented in the prior studies. Special papers have also been published by those connected with the investigation.[9]

II

The reader's familiarity with the type of examination given to applicants for life insurance is assumed. Those accepted were placed in certain impairment groups depending on the findings in these examinations. Summary sheets for these specific impairment groups, with the subsequent mortality, were furnished by most of the large insurance companies in America for the 1929 study (about four-fifths of the total insurance in force in the United States and Canada and about two million policies).

Because the succeeding analysis depends on the ratio of actual to expected deaths, a little consideration of the summary sheet is necessary.[10] The basic mortality rates are graded and are specific for age and the number of years the policy has been in force. The basic table covered policies issued during the period 1909-1927. By multiplying

[9] For example: Hunter, Arthur: Heart Murmurs, An Historical Review. A New Mortality Experience. Modern Ratings. *Transactions of the Actuarial Society of America*, October, 1936, xxxvii, Part 2, No. 96.

[10] The form of the summary sheet is as follows, one age group being shown as an example:

Policy Year	Ages 20 to 24					
	Existing	Lapsed	Dead	Exposed	Basic Rate[a]	Expected Deaths
1					2.11	
2					2.82	
3					2.99	
4					3.09	
5					3.17	
—					—	
—					—	
—					—	
19					4.45	
Total						

[a] Per 1,000.

A summary sheet consists of corresponding units for each five-year age group. One sheet is used, by each insurance company, for each impairment or special subdivision included in the study. At the bottom are given the number of deaths for major causes in two age groups, 15-39 and 40 and over.

the number "exposed" by the basic rates (divided by one thousand), there is obtained the number of "expected deaths" for a given policy year and age group. These "expected deaths" are then added together to give the total for all age groups, regardless of the time the policy had been in force. The total number of deaths which actually occurred in the given impairment group is then divided by the "expected" number as thus calculated. We then have a *ratio,* actual to expected. An understanding of this procedure is important, since otherwise a person might not realize that this ratio is really one between two *death rates,* corrected for age differences and also for differences in the time the policies had been in force. The average age of persons in different impairment groups varies a good deal, and the results would be quite ambiguous if this difference had not been allowed for. Most important also is it to realize that there is nothing abstruse in this "expected death" idea. It does not need to be taken as a concept that non-actuaries cannot understand. Of course, back of the "expected deaths" do lie all the grading or interpolation procedures of actuaries, but these need not concern us, as they involve simply the smoothing of the basic mortality rates.

Some mention should be made of what the actuary calls "substandard" data. If a person is compelled to take out life insurance at a higher than normal premium because of physical findings or occupation, he is regarded as a "substandard" risk. The medical impairment study has separated these two groups for most of the comparisons, but interpretation of differences in the after-mortality for the standard and substandard groups is difficult without a detailed knowledge of insurance practice for specific impairments. For the present purpose the combination of standard and substandard, where given, is most desirable. In some cases the study involves substandard groups only and must then be shown as such.

The impairment classes deal with cases which have no impairment of importance other than the one referred to. By "impairment of importance" is meant one which of itself would have placed the

person in a substandard group. The impairment class may be a combination of more than one impairment, but in that case the combination will be specified. These facts add significance to the results.

As stated, the 1929 study covered policies issued between 1909 and 1927. The mortality of persons whose policies were issued in the first year could be followed for nineteen years; on the other hand, those whose policies were issued at a later date could be followed for shorter periods only. Where the impairment group constituted a history, the period between the first existence of the disease and that covered by the ratios would be relatively longer. However, the procedure does not enable us to follow a person through to the late effects of disease.

Table 1. Ratio of actual to expected mortality among persons with certain impairments on examination for life insurance (present or history).

Impairment Group	Ratio	Actual Deaths
Organic Heart Murmurs	2.50*	3,583
Cancer, With Operation (History)	2.35	35
Epilepsy (History or Found on Examination)	2.02	51
High Blood Pressure, 5 mm. or More Above Average	1.87*	1,503
Lungs Unsatisfactory (Dullness, Prolonged Expiration, Suspicious Apices)	1.81*	64
Hypertrophy of Heart, Without Murmur	1.64	99
Appearance Fragile, Not Robust	1.61	255
Abdominal Circumference Markedly Greater than Expanded Chest (Special Weight Group)	1.52	203
Gastric or Duodenal Ulcer (History)	1.48	334
Syphilis (History)	1.47	496
Asthma, not Hay Fever (History)	1.43	450
Functional Heart Murmurs	1.41*	502
Albumin in Urine	1.40	—
Persistent Rapid Pulse	1.39	409
Glycosuria, No Diet	1.37	118
Pleurisy (History)	1.36	1,073
Anemia (Hemoglobin 60 to 80 per cent)	1.30	26
Bronchitis, Chronic (History or Examination)	1.29	116
Spinal Curvature	1.27	196
Tuberculosis of Bones or Joints (History, Excludes Attacks Within 2 Years of Application)	1.25	200
Rheumatism, Acute Articular (History)	1.18	1,397

*Limited to substandard policies.

III

Table 1 gives the ratio of actual to expected deaths in those impairment groups which, taken as units, showed definite excess rates of mortality. The actual number of deaths is included as an indication of the significance of the figures. Since the death rate for the group under observation was about 5 per 1,000[11] an estimate of the population in the various impairment groups is possible. The Joint Committee reports also give the probable errors of these ratios.

Table 2. Ratio of actual to expected mortality among persons with certain impairments on examination for life insurance (present or history). Ratios of 2.50 or higher for specific subgroups.

Impairment Group	Ratio	Actual Deaths
Apex Murmur, Presystolic or Diastolic, Constant and Other Mitral Regurgitation, With Slight Hypertrophy	8.03*	20
Without Slight Hypertrophy	5.53*	61
Basic Murmur, Aortic Area, Diastolic, Constant, Transmitted Downward, With Other Aortic Regurgitation, With Slight or Moderate Hypertrophy	4.78*	78
Without Slight or Moderate Hypertrophy	4.55*	51
High Blood Pressure, 45 mm. and More Above Average	3.84*	34
Cancer, With Operation, Attack Within 3 to 5 Years of Application	3.73*	Few
Apex Murmur, Systolic, Constant, Transmitted to Left, With History of Rheumatism	3.58*	—
Albumin in Urine, Intermittent, Large Amount	3.33	17
Basic Murmur, Aortic Area, Systolic, Constant, Transmittted Upward	3.09*	212
Tuberculosis of Bones or Joints, Attacks 3 to 10 Years Before Application	3.02	80
Albumin in Urine, Constant, Large Amount	2.98*	70
Albumin in Urine, 30 per cent or More over Average Weight for Height and Age	2.91	124
Apex Murmur, Systolic, Constant, Transmitted to Left, With History of Infectious Disease Other than Rheumatism	2.90*	609
High Blood Pressure, 35-44 mms. Above Average	2.65*	138
Pulmonary Tuberculosis, With Physical Signs on Examination, and With History of Attack 3 to 5 Years Before Application	2.53	—
Apex Murmur, Systolic, Constant, Transmitted to Left, Without History of Infectious Disease	2.51*	2,430

*Limited to substandard policies.

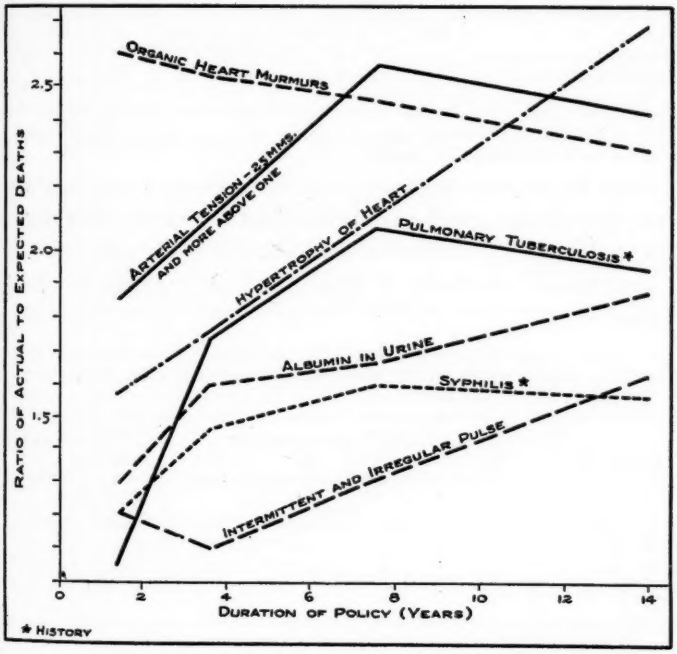
[11] The death rate is low primarily because the group was under observation for a maximum of nineteen years from the date of examination.

Items with an asterisk are those where the data were limited to substandard risks.

If, now, the impairment groups are broken into their component parts, a far greater excess can be found in special instances. This is done in Table 2, which is limited to groups with mortality two and one-half times the normal—in other words, really stopping at the point where Table 1 begins.

The ratios for many conditions in these two tables are of great interest—especially for organic heart murmurs, high blood pressure, syphilis, albumin in urine, tuberculosis—but it should be emphasized that the tables give only a glimpse into the subject. The

Fig. 1. Ratio of actual to expected mortality after a specified number of policy years, for certain impairment groups.



Impairment Groups	Ratio				Number of Deaths			
	1–2 Years	3–5 Years	6–10 Years	11–19 Years	1–2 Years	3–5 Years	6–10 Years	11–19 Years
Arterial Tension (Examition) 25 mm. and More Above Average	1.85	2.11	2.57	2.40	216	263	224	47
Organic Heart Murmurs (Examination)	2.61	2.53	2.45	2.29	996	1,215	1,038	334
Hypertrophy of Heart (Examination)	1.57	2.09	1.79	2.68	23	34	20	8
Pulmonary Tuberculosis (History)	1.03	1.74	2.07	1.93	55	93	69	21
Arterial Tension (Examination) 5-24 mm. Above Average	1.40	1.68	1.96	1.71	211	293	228	47
Albumin in Urine (Examination)	1.28	1.60	1.66	1.87	303	452	369	141
Syphilis (History of an Attack)	1.21	1.47	1.60	1.55	86	150	162	98
High Abdominal—Chest Ratio	1.60	1.63	1.98	1.45	68	92	133	58
Intermittent and Irregular Pulse (Examination)	1.22	1.10	1.31	1.62	72	80	74	42

Table 3. Ratio of actual to expected mortality after a specified number of policy years, for certain impairment groups.

medical impairment study presents the ratios for a couple of hundred impairment groups or subdivisions. Certainly these figures give to the findings of medical examinations a very specific reality, and set up one possibility of approach to the problem of chronic disease.

Table 4. Ratio of actual to expected mortality among persons found to have abnormal arterial tension without other serious impairment in relation to the duration of the policies. Substandard.

Policy Years	Ratio			Deaths		
	5–15[1] Mms.	16–24[1] Mms.	25+[1] Mms.	5–15[1] Mms.	16–24[1] Mms.	25+[1] Mms.
1– 2	1.37	1.43	1.85	105	106	216
3– 5	1.62	1.96	2.11	153	140	263
6–10	1.59	2.44	2.57	104	124	224
11–19	1.69	1.73	2.40	9	12	47

[1]Excess of systolic blood pressure reading over the average.

How long does this excess persist? As stated, there is a maximum of nineteen years set in this study from the date of issuance of the policy. It is clear from Figure 1 and Table 3 that the excess for many important conditions is still present at the end of this period. Again, the comparison is to be taken as a sample. The original study gives the ratios in the four periods for about two hundred impairment groups or subdivisions. Table 4 indicates the excess mortality for persons found to have different degrees of high blood pressure (without definite heart disease) on application for insurance.

A point of some interest is the nature of the excess mortality

Table 5. Ratio of actual to expected mortality from pulmonary tuberculosis among persons having or giving a history of certain impairments on application for life insurance. Limited to groups showing a ratio of two or more. Substandard policies.

	Ratio
Pleurisy (History of One Attack Within 10 Years)	
With Effusion	13.7
No Details	9.5
Purulent	3.8
Dry (Standard Policies)	3.1
Pulmonary Tuberculosis (History of One Attack 2 Years or More Prior to Application)	
10 Per Cent Underweight	10.7
All Weights	7.0
Lungs Unsatisfactory (Dullness, Prolonged Expiration, Suspicious Apices) on Examination	7.9
Persistent Rapid Pulse (90-100) on Examination	5.7
Appearance Fragile, Not Robust, 10 Per Cent or More Underweight	5.4
Asthma (Not Hay Fever), Moderate or Severe on Examination or History, or Attack Within 5 Years	3.7
Tuberculosis of Bone or Joint, One Attack More Than 2 Years Before Application	3.4
Hysteria, Nervousness, Neurasthenia, Nervous Prostration (Examination or History)	3.0
Gastric Ulcer, Operation, One Attack 3-10 Years of Application, or 2 or More, Last 10 Years Before	2.5
Bronchitis, Chronic (Examination or History)	2.4
Syphilis, Cured, Thorough Treatment (History of One Attack)	2.1
Albumin in Urine, Constant Trace	2.0

associated with specific impairments. It is not surprising that very high ratios should be secured for certain causes of death in some impairment groups; that, for instance, the groups with apex murmur, presystolic or diastolic, constant, and other mitral regurgitation, should show a mortality from organic heart disease 31 times the normal. These ratios will not be reviewed here, as the subject is a little outside the scope of this discussion; but it is of interest to show that frequently there is excess mortality from causes which are not identical with the impairments themselves. For instance, the group having pleurisy with effusion, one attack within five years, shows 14 times as many deaths from pulmonary tuberculosis as expected. (Table 5.)

IV

It will be advantageous to summarize the data of the Joint Committee on Mortality by making a slightly more detailed comparison for a single disease. Many could be selected, but perhaps none would be more useful than syphilis. However, the same type of specific and valuable information will be found in the reports for many other diseases.

The subdivisions of the data for syphilis (which are limited to cases with a history of one attack) are of three types: (a) standard and substandard; (b) "cured, thorough treatment," and others; (c) how long prior to the application for insurance the attack occurred. ("Cured" implies freedom from any active symptoms of the disease as indicated by two or more negative Wassermann tests.)

The ratio in the standard group was 1.52, and in the substandard, 1.45. Variations in insurance practice are no doubt responsible for a result that seems a little inconsistent.

The distinction between "cured, thorough treatment" and the other cases is affected by factors of selection. The "cured, thorough treatment"[12] group had ratios of 1.63 and 1.50 for standard and sub-

[12] Owing to difficulties of interpretation, the distinction between "cured, thorough treatment" and the other group is not carried in the accompanying tables.

	Ratio	Deaths
One Attack, 3–5 Years of Application	1.47	39
One Attack, 6–10 Years of Application	2.12	124
One Attack, Over 10 Years of Application	1.18	170

Table 6. Ratio of actual to expected mortality among persons giving a history of syphilis, by type of history. Substandard policies.

standard risks, against ratios of 1.42 and 1.41 for the group other than "cured, thorough treatment." In spite of this selective difference, we can feel particularly interested in the after-mortality of the "cured, thorough treatment" group. There was a continuing excess mortality for this group which was still present at the end of the period covered.

Before discussing the tables, let us consider the third basis of classification, namely, the time since the reported attack. The groups used are: one attack, within two years of application for insurance; one attack within three, four, five years of application; one attack within 6-10 years of application; one attack over ten years prior to application. The figures will show that the time between the attack and the application is closely tied up with the rate of mortality.

The data will be available in the Joint Committee's report against the duration of the policy; and also, separately, against the age of the insured. Finally, information will be available as to the causes of death.

Thus, we have for this disease a wealth of material which de-

Table 7. Ratio of actual to expected mortality among persons giving a history of syphilis and whose policies had been in force for 6 to 19 years, by type of history obtained. Substandard policies.

	Ratio	Deaths
One Attack, Any Time Prior	1.59	179
One Attack, Within 6–10 Years of Application	2.33	90
One Attack, Over 10 Years of Application	1.17	76

serves more careful consideration than can be given to it in this discussion. Some few points only will be exemplified.

Table 6 presents the ratio against the interval between the attack and the issuance of the policy. Table 7 gives corresponding information for the 6-19 policy years. Table 8 relates the excess to the years the policies had been in force.

Table 8. Ratio of actual to expected mortality by time policies had been in force, for persons giving a history of one syphilis attack within ten years of application. Substandard.

	Ratio	Deaths
1– 2 Years	1.14	23
3– 5 Years	2.15	51
6–10 Years	2.45	62
11–19 Years	2.11	28

One caution is desirable. Although the groups under consideration do not include any persons who are substandard risks at the time of issuance of insurance because of some other impairment, their history subsequent to the issuance of the policy is not a part of the record, except the one question as to their death. Therefore, some check as to the cause of death is desirable. For the "cured, thorough treatment" group the ratios of actual to expected deaths from a particular cause (adjusted to two age groups) were: cancer, 2.3; pneumonia, 2.1; tuberculosis of the lungs, 2.1; suicide, 1.8; accident, 1.4. For the other syphilis group they were: organic heart disease, 3.0; nephritis and Bright's disease, 2.1; cancer, 1.7; pneumonia, 1.5. A significant difference in type between the two groups might be inferred.

Table 9. Ratio of actual to expected mortality among males classified by their deviation from normal weight at the time of examination. By age. Height 5 feet 3 inches to 6 feet 2 inches.

Variations from Average Weight in Pounds	Age at Issuance of Policy			
	20–29	30–39	40–49	50–59
—25 or More	1.18	1.05	.83	.77
—10 to —20	1.01	.94	.76	.85
−5 to +5	.92	.84	.87	.92
+10 to +20	.99	.88	.94	.90
+25 to +45	1.13	1.23	1.25	1.19
+50 or More	1.63	1.43	1.44	1.30

v

The studies of the Joint Committee make available a great deal of information of a type not included in the above comparisons. For instance, an interesting subject is the relative rates of mortality of persons by type of build. The general outlines of this picture are well known because they were given considerable publicity after the publications of 1912-1914. Overweight is a disadvantage at all ages; underweight is a disadvantage among young persons, but an advantage in mature and later life. This is brought out briefly in

Fig. 2. Ratio of actual to expected mortality among males classified by their deviation from normal weight at the time of examination. By age. Height 5 feet, 3 inches to 6 feet, 2 inches.

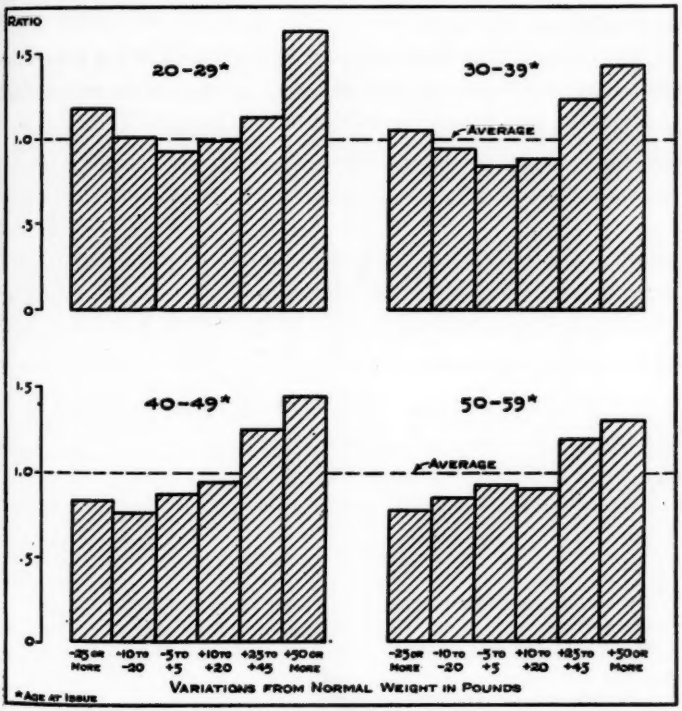


Table 9 and Figure 2. Again it should be stressed that these comparisons are for persons who did not have important recorded defects. The nature of the excess mortality in the overweight group is shown in Table 10—it is clearly the so-called degenerative diseases that are largely responsible—organic disease of the heart (exclusive of deaths classified as endocarditis, myocarditis, and pericarditis), cerebral hemorrhage and apoplexy, and nephritis and Bright's disease.

As an example of other data of great interest, there is included Table 11, giving the excess mortality depending on the number of cases of tuberculosis in the family. There is a clear relation between the number of cases and the mortality rate in the 15-29 and 30-44 age groups.

Some material is available as to the excess mortality for some conditions figured from the date of attack or operation rather than

Table 10. Mortality rates (per 100,000) by cause among males, age 30+ at entrance who were markedly underweight and markedly overweight. Height 5 feet 3 inches to 6 feet 2 inches. Standard risks.

	Tuberculosis of Lungs	Other Tuberculosis	Diabetes	Cerebral Hemorrhage and Apoplexy	Organic Disease of Heart[1]	Appendicitis and Typhlitis	Nephritis and Bright's Disease	Cirrhosis of Liver
30–44 Years at Entrance								
Underweight, 25 Pounds or More	94	9	3	8	26	12	25	2
Standard	59	3	8	27	39	18	33	4
Overweight, 50 Pounds or More	4	1	19	34	71	29	63	16
45 Years+at Entrance								
Underweight, 25 Pounds or More	67	21	18	67	161	14	109	7
Standard	30	4	25	118	213	25	123	23
Overweight, 50 Pounds or More	10	–	35	156	253	43	171	31

[1]Exclusive of deaths classified as endocarditis, myocarditis, pericarditis.

from the date of issuance of the policy. Such data are shown in Table 12 for gastric and duodenal ulcers and for gallbladder disease.

	All Ages	15–29	30–44	45+
	RATIO			
One Case	.95	1.34	.91	.85
Two Cases	.98	1.71	.98	.83
Three or More	1.10	2.66	1.21	.81
	DEATHS			
One Case	8,360	1,816	3,261	3,283
Two Cases	1,856	328	726	802
Three or More	656	112	278	266

Table 11. Ratio of actual to expected mortality among persons with varying numbers of cases of tuberculosis in the family, according to the age at issuance of policy.

VI

By way of conclusion, it is manifest that many conditions, ascertainable by a type of relatively inexact physical examination and history, offer a definite risk of excess mortality in later years. This risk is present even for persons who were in good enough health at the time of examination to be accepted for life insurance. The conditions to which this excess after-mortality is attached are largely the chronic diseases or diseases with a chronic aftermath.

For example, the actual mortality among those who were found to have organic heart murmurs but no other important impairment were from two and a half to eight times the expected mortality among persons at similar ages; persons having blood pressure read-

Table 12. Ratio of actual to expected mortality among persons by duration from attack or operation.

	Duration from Attack or Operation			
	2–5	6–10	11–15	16–21
Gastric or Duodenal Ulcer				
Operated	1.66	1.32	1.43	1.39
Not Operated	1.24	1.06	.77	
Gallbladder				
Removed	1.16	1.12	.91	.87
Drainage (Not Removed)	1.42	1.25	1.21	

ings of 35 millimeters and more above standard and those having a large amount of albumin in the urine, either constant or intermittent (again with no other important defect recorded) had a death rate from two and a half to almost four times the normal. Those who gave a history of having had diseases such as cancer (with operation), syphilis, pleurisy, and tuberculosis, suffered an excess of deaths ranging from one and a half to four times the expected number. The excess mortality among persons with these diseases or conditions tended to continue throughout the nineteen-year period for which records were available.

A point of some interest is the nature of the excess mortality among persons applying for life insurance who gave a history of having had an attack of syphilis. Those who were not classed as cured (thorough treatment) suffered a marked excess of mortality, chiefly from such chronic conditions as organic heart disease, nephritis, and cancer. On the other hand, the excess deaths among those with a history of syphilis but considered as cured when the medical examination was made were largely due to cancer, pneumonia, tuberculosis of the lungs, suicide, and accident.

The chronic diseases cast their shadow before them. In the baffling problem of these diseases, therefore, one possible direction of attack is suggested, but it must not be overlooked that it is one thing to find a condition and another thing to cure that condition or to eliminate the risk of later effects. The public health administrator must determine what can be done in the light of these facts. There appear to be two problems: first, how to identify these signs of chronic disease at the earliest possible moment, and second, to determine how to eliminate the associated risk of mortality. For these problems there are obviously no simple solutions.

TUBERCULOSIS CONTROL IN THE MULBERRY DISTRICT OF NEW YORK CITY[1] [2]

by JEAN DOWNES AND CLARA R. PRICE, R.N.

AN intensive tuberculosis program was started January 1, 1935 in one of the congested areas of New York City by the Department of Health and the Mulberry Health Center. Health Area 69, the section served by the Mulberry Health Center, lies roughly between Broadway and the east side of the Bowery, extending from East Houston Street on the north to one block south of Canal Street. The special tuberculosis program in this area is being developed primarily to ascertain through epidemiological study of the disease the most effective ways of case-finding and supervision in an Italian community where the morbidity and mortality rates are relatively high.

An excellent description of some of the characteristics of the neighborhood served by the Mulberry Health Center may be found in the study "Idleness and the Health of a Neighborhood" published in 1933.[3] The population is relatively homogeneous since "over 98 per cent of the heads of households in April, 1932, were of Italian birth or parentage." Within the past five years there may have been some change in the nativity of the heads of households but it is believed that the population is still predominantly Italian.

The Mulberry Health Center area is a tenement district. Data from the Real Property Inventory[4] conducted in New York in 1934 reveal some of the social characteristics and living conditions of the area. At the time the inventory was made there were 5,066 families

[1] From the Mulberry Health Center, the Milbank Memorial Fund, and the Bureau of Tuberculosis of the New York City Department of Health.

[2] Acknowledgments are made to Dr. W. H. Frost of the Johns Hopkins School of Hygiene and Public Health; to Dr. J. Burns Amberson of the Tuberculosis Service of Bellevue Hospital; and to Dr. H. R. Edwards, director of the Bureau of Tuberculosis of the New York City Department of Health, for helpful suggestions and criticisms concerning the presentation and analysis of the data of this study.

[3] Berry, Gwendolyn Hughes: Idleness and the Health of a Neighborhood. New York Association for Improving the Condition of the Poor, 1933.

[4] Real Property Inventory—City of New York—Borough of Manhattan, Residential Report, 1934.

in the area occupying 5,033 family quarters. The majority of households (52 per cent) contained four or more persons per household; and less than 10 per cent was classed as one-person households. In 45 per cent of the family quarters there was more than one person per room. Eighty per cent of the family quarters had no central heating plant, 77 per cent had no bathtub or shower, 54 per cent no hot water, and in 48 per cent of the household quarters there was no private indoor toilet.[5]

The data concerning monthly rentals in 1934 throw further light upon the social and economic status of the families living in the district. Eighty-nine per cent paid less than $30.00 per month for rent, 55 per cent paid less than $20.00 per month, and for approximately 10 per cent the monthly rental was under $10.00. The depression may have caused a downward shift in rentals; however, data of rentals obtained in the 1930 census indicate that 79 per cent of the families at that time paid less than $30.00 per month for rent.

From these data it may be concluded that the families of the Mulberry district on the whole have a relatively low economic status, and the majority of them are living in a generally unfavorable environment, if crowding and housing conditions be taken as an index. Under such circumstances control of tuberculosis in this area offers an especial challenge.

The Mulberry Health Center with its staff of seven field nurses under the direction of Miss Clara R. Price, R.N., represents the Department of Health and the nurses are responsible for the public health nursing care of the tuberculous patients and their families in the district. The local tuberculosis clinic of the Department of Health, directed by Dr. A. A. Feller, is responsible for providing clinic and X-ray examinations for patients referred by the staff of the Health Center.

When the special program was started in January, 1935, the

5 It is believed that there has been some improvement in the housing conditions since 1934 but data to indicate the extent of change are not available.

following groups of families were selected for intensive service and study: all families in the district in which there was a known active or arrested case of re-infection type tuberculosis were to be included and the new families in which cases in these categories were discovered were to be added during the period of special study; all families in which a death from tuberculosis had occurred during the period 1928-1934 but in which there were no known active cases January 1, 1935, were to be followed; all families in which there was evidence of primary infection in a child but no known active cases of secondary infection were to be carried and an effort was to be made to locate the source of infection. Families related by blood or marriage to any of the above classes of tuberculous families were to be investigated for case-finding to ascertain whether or not there had been spread of tuberculosis from one family to another. In addition, families in which there were individuals judged by the nurses as suspects were to be investigated.

An effort has been made to ascertain the actual morbidity from tuberculosis in the district through special case-finding surveys and accurate reporting of newly diagnosed cases. Transcripts of clinic examinations of all individuals living in the area who have had a clinic examination are obtained from the various clinics and hospitals and are filed with the family records at the Health Center. Records of hospitalization for all diagnosed cases hospitalized are also obtained. Reports of all tuberculosis cases and deaths in the district are sent from the Branch Office of the Bureau of Tuberculosis to the Mulberry Center. Reports are also secured from the private physicians concerning cases under their care. It is believed that all cases in the district known to official agencies are also known to the Health Center.

Two years have elapsed since the beginning of the special study and it is believed that it is now suitable to take some stock of what is being accomplished so that the program may be modified when it seems advisable and emphasis placed where it is most needed.

TUBERCULOSIS MORTALITY IN THE MULBERRY DISTRICT

Mulberry district is considered one of the areas of high tuberculosis mortality in New York City. The average annual death rate from all forms of the disease during the five-year period 1931-1935 was 115.8 per 100,000 population contrasted with 66.5 for the City.[6]

The tuberculosis death rate in this area is considerably affected by tuberculosis deaths among a floating population, individuals who give a Bowery lodging house as their place of residence.[7] Thirty-nine deaths from tuberculosis occurred during the period 1931-1935 among unattached men giving lodging houses within the district as their residence. If these deaths be excluded, the rate of 78.1 per 100,000 is probably more accurate for the families of the Mulberry area, and contrasts more favorably with the rate of 66.5 for New York City as a whole.

During the past two years the intensive tuberculosis program has been carried on mainly in the families of this district. The Health Center and the Department of Health are aware of the problem of tuberculosis among the floating population of the lodging houses but so far a practicable method of attacking the problem has not been evolved.[8]

RESULTS OF EXPERIMENTS IN CASE-FINDING

Case-finding has been one of the major objectives of the special

[6] Resident tuberculosis rate for Health Area 69—data obtained from Annual Reports of Vital Statistics by Health Areas and Health Center Districts, New York City Department of Health. The death rate for New York City (corrected for residence) is the average annual rate for 1933-1935—Annual Reports of Division of Vital Statistics, New York State Department of Health.

[7] In June 1936 a survey was made of the twenty-three lodging houses in the district. All but two are on the Bowery; those two are on Hester Street and Broome Street, just off the Bowery. The twenty-three lodging houses have a total bed capacity of 4,139. These lodging houses or hotels keep registers of patrons, but it is impossible to get accurate information as to the extent to which the bed capacity is used daily or weekly or as to the turnover of the population.

[8] The problem of tuberculosis among the population of the lodging houses in the district is being carefully studied by the Health Center. All lodging house cases reported from hospitals or other sources in the City are visited by a nurse from the Center. A careful history of education, past occupation, past residence, a history of health previous to the breakdown from tuberculosis, and a history of contact with tuberculosis are secured from the patient. The study will be reported upon when sufficient data are gathered and it is hoped that it will be helpful in future plans for a more effective program of tuberculosis control among this population in the Mulberry district.

tuberculosis study conducted in the Mulberry Health Center district. Various methods are being tried in order to determine which may be employed most effectively in a congested area of a large city. Briefly stated they are as follows:

1. A tuberculin testing survey of grade school children in the district with X-ray examination of positive reactors and the members of their families.

2. Clinic examination of the members of families who are blood relatives of a tuberculous individual but not living in household contact with that individual.

3. Clinic examination of individuals who have had a recent attack of acute respiratory disease such as pneumonia, pleurisy, acute bronchitis, and influenza, and examination of other suspects.

These methods have been tried during the past two years, 1935 and 1936, and it seems entirely proper to examine the results of each as critically as two years' experience will permit.

Case-Finding through Tuberculin Testing of Grade School Children. As stated above, one method of tuberculosis case-finding employed was a tuberculin testing survey. The survey was conducted in May, 1936, among children in the three public schools in the district. An effort was made to have all children who reacted positively to the tuberculin test X-rayed, and as many members of their families as possible were given a clinic examination in order to find the source of infection.[9]

Consent for giving the test to the children was obtained from the parents through home visits made by the nurses and through publicity in the public schools. So effective was this effort that consents were obtained for 64 per cent of the total 3,005 children enrolled in the public schools in the district. Table 1, which shows

9 Arrangements for the tuberculin testing survey were made by the Bureau of Tuberculosis of the City Department of Health in cooperation with the Department of Education. The tests were made by one physician in the schools and for the most part the reaction was read in the schools by the same physician. In a few instances readings were made by the nurses in the homes of the children. The intracutaneous test with 0.1 mgm. of Old Tuberculin was given to all children for whom consents were obtained. The tuberculin used in this survey was Old Tuberculin (human) prepared and standardized on guinea pigs by the Laboratories of the New York City Department of Health.

Grade	Per Cent of Children Tuberculin Tested	Number Registered in Public Schools 1935-1936
	Total Public Schools	Total Public Schools
All Grades	64.4	3,005
Kindergarten	31.9	188
First Grade	57.2	299
Second Grade	66.3	291
Third Grade	66.2	284
Fourth Grade	65.2	336
Fifth Grade	71.3	341
Sixth Grade	75.8	363
Seventh Grade	63.3	379
Eighth Grade	70.8	373
Ungraded Class	54.3	151

Table 1. Number of grade school children registered in the public schools and the proportion given the tuberculin test, May, 1936, Mulberry Health Center district, New York.

the total enrollment by grade for each school, indicates that above the second grade the proportion tested ranged from 63 to 75 per cent. There seemed to be some hesitancy on the part of the parents to permit the testing of the very young school children since only 32 per cent of those in kindergarten was tested.[10]

The results of the test among children in each of the three schools were fairly uniform. The proportions found positive at various ages are shown in Table 2. For children at all ages, the per cent with a positive reaction ranged from 29 in Public School 130 to 34 for those in Public School 21. When the average rates for all ages are adjusted for differences in the age distribution, the variation between schools is even less; the range is from 30 to 33 per cent.

As has been noted in other tuberculin testing surveys of school children, the prevalence of infection increases with age. From 20 to 23 per cent of the children aged 5 to 9 had a positive reaction to

[10] Kindergarten classes were conducted in two sessions, morning and afternoon, with different children at the two sessions. The tuberculin tests were given in the mornings. Children attending the afternoon session of kindergarten had to make an additional trip to school. This may have influenced the proportion tested.

Age Groups	Per Cent of Children Positive to Tuberculin (0.1 mgm. O.T.)				Number Given Tuberculin Test			
	Total Public Schools	Public School 21	Public School 23	Public School 130	Total Public Schools	Public School 21	Public School 23	Public School 130
5-16 Years	32.2	33.8	33.3	28.8	1,940	843	535	562
Adjusted for Age[1]		33.4	31.5	30.4				
5-9 Years	22.3	23.3	20.0	22.6	695	266	155	274
10-14 Years	36.2	37.3	35.9	34.4	1,176	552	351	273
15, 16 Years	63.8	68.0	72.4	40.0	69	25	29	15

[1]Rates adjusted to the age distribution of the total children tested in the public schools.

Table 2. Results of tuberculin testing grade school children in the public schools, April, 1936, Mulberry Health Center district, New York.

tuberculin, and at ages 10-14 from 34 to 37 per cent had a positive reaction. Among children over 14, the rate for the three schools combined was 64 per 100 children tested. However, only sixty-nine children over 14 years of age were tested, a number that is too small to be representative of children of that age in the district or to afford a reliable infection rate.

The varying strength of the tuberculin used in surveys in different places renders a comparison of the results of one with another of somewhat dubious value. However, a tuberculin testing survey of school children in one area of Philadelphia made some ten years ago indicates a prevalence of tuberculous infection among those aged 5-14 only slightly higher than that noted among children in the Mulberry district.[11] These data are compared in Table 3.

The children in the Mulberry district who were found to be negative to 0.1 mgm. of Old Tuberculin were not retested in the schools. However, an effort was made by the nurses to have some of the negative reactors retested with 1.0 mgm. at Washington Clinic. Retests were secured for 170 children; twelve, or 7 per cent, had a positive reaction to the test. The age distribution of the 170 children was similar to that of the total children tested in the three

[11] Hetherington, H. W.; McPhedran, F. Maurice; Landis, H.R.M.; and Opie, Eugene L.: A Survey to Determine the Prevalence of Tuberculous Infection in School Children. *The American Review of Tuberculosis*, October, 1929, xx, No. 4.

Age Groups	Per Cent Positive to Tuberculin	Number Positive to Tuberculin	Total Tested
	0.01 mgm. of O. T.[2]		
Total 5–14 Years	39.6	1,052	2,654
5–9 Years	27.8	262	942
10–14 Years	46.1	790	1,712
	Retests 0.1 mgm. O. T.		
Total 5–14 Years	52.6	1,397	2,654
5–9 Years	36.2	341	942
10–14 Years	61.7	1,056	1,712

[1]Data taken from the following: Hetherington, H. W.; McPhedran, F. Maurice; Landis, H. R. M.; and Opie, Eugene L.: A Survey to Determine the Prevalence of Tuberculous Infection in School Children. *The American Review of Tuberculosis*, October, 1929, xx, No. 4.

[2]It is believed that the results of testing with 0.01 mgm. of Old Tuberculin in the Philadelphia study are more nearly comparable with results obtained in the New York survey with 0.1 mgm. of O.T. It is generally recognized that the tuberculin used in the studies conducted by the Henry Phipps Institute was of greater strength than that used in other studies of a similar nature.

Table 3. Prevalence of tuberculous infection among school children in Philadelphia.[1]

public schools. If this per cent, 7, be applied to the total 1,316 children found negative, it is estimated that some ninety-two additional children with tuberculous infection would have been discovered had all negative reactors been retested with 1.0 mgm. of Old Tuberculin. Retesting would have modified the average infection rate among the children in the three schools only slightly, raising it from 33 to 36 per 100 children tested.

Three hundred and twenty-six, or 80 per cent, of the total children living in the district who had a positive reaction to tuberculin had an X-ray of the chest at Washington Clinic by the end of 1936. No cases of re-infection type tuberculosis (adult pulmonary) were discovered among the children X-rayed.

The chief purpose of the tuberculin testing of grade school age children is to discover the unknown infectious cases in the community through the examination of the family contacts of the child who has acquired tuberculous infection. If through an intensive campaign against the disease it is believed that many of the cases

in the community are already known at any given time, it is logical that such a survey should lead back into or identify the families of the known as well as the unknown. The intensive program in Mulberry Health Center district makes it possible to test the validity of this assumption.

During 1936, as shown in Table 4, there were 175 families in the Mulberry district carried by the Health Center because of the presence of one or more cases of active or arrested adult pulmonary tuberculosis (re-infection type) in the family or a history of a death from pulmonary tuberculosis. In seventy-eight of the families the only case in the family was one classed as arrested when the final diagnosis was made and only two of these cases gave a history of illness from tuberculosis.

There were no grade school age children in fifty-two, or 30 per cent, of the 175 known tuberculous families. As shown by Table 4, these families had only infants or preschool age children or only young adults over grade school age or were composed only of adults over 30 years of age. Obviously these families would not be directly discovered through a tuberculin survey of grade school children.

In 123 of the known tuberculous families there were grade school age children in the family. The children in sixty-four of these families attended the public schools in which the special survey was conducted and those in the remaining fifty-nine families attended either one of the two parochial schools in the district or the Children's Aid School.[12] The two parochial schools and the Children's Aid School were not included in the tuberculin testing survey; consequently a survey conducted only in the public schools of this particular district might be expected to reveal about one-third of the known tuberculous families. Actually, in twenty-two of the families in which the children attended public schools, the children have remained negative to tuberculin even with repeated tests during 1935 and 1936.

[12] The Children's Aid Society conducts a kindergarten and nursery school in the Mulberry Health Center district.

Classification of Families	Total Families	Families New Since 1935			Families Known Before 1935		
		Index Case Active Pulmonary Tuberculosis	Index Case Death from Pulmonary Tuberculosis	Index Case Arrested Case of Pulmonary Tuberculosis	Index Case Active Pulmonary Tuberculosis	Index Case Death from Pulmonary Tuberculosis	Index Case Arrested Case of Pulmonary Tuberculosis
Total Families	175	18	15	18	28	36	60
No Grade School Age Children in Family	52	7	6	2	12	16	9
No Children in Family	0	0	0	0	0	0	0
Only Infants or Preschool Children							
Positive to O.T.	1	0	0	0	1	0	0
Negative to O.T.	4	1	0	0	2	0	1
All Children Young Adults over School Age (17–29 Years)	33	3	6	0	5	15	4
Family All Older Adults (over 30 Years)	14	3	0	2	4	1	4
Grade School Age Children in Family	123	11	9	16	16	20	51
In School Survey							
Positive to O.T.	42	4	2	7	5	11	13
Negative to O.T.	22	2	0	4	2	1	13
Not in School Survey							
Positive to O.T.	24	2	3	2	3	6	8
Negative to O.T.	18	0	1	1	4	1	11
Not Tested	17	3	3	2	2	1	6

Table 4. Total known tuberculous families in Mulberry Health Center district during 1936, classified according to the presence of children of grade school age in the family.

As was stated above, one of the main purposes of the tuberculin testing survey of school children is to find the infectious case through the examination of the family contacts of the child who

has acquired tuberculous infection. By the end of 1936, 223 contacts in seventy-eight of the 218 newly discovered families in which there were positive reactors had a clinic examination. One active case of re-infection type disease (adult pulmonary tuberculosis) was discovered or a rate of 0.4 per 100 persons examined. This case was an eighteen-year old girl with a negative sputum in whom the disease was classed as in the minimal stage. Five cases of arrested tuberculosis (re-infection type) were diagnosed on X-ray among the contacts. None had a history of ever having had active disease.[13]

From this analysis it seems clearly evident that a tuberculin testing survey of grade school age children and examining of family contacts will detect or lead to a smaller proportion of the active infectious cases in a community such as the Mulberry Health Center district than is commonly believed. A relatively high proportion of the known tuberculous families are missed on such a survey because there are no grade school age children in the family. Also, only one active case of tuberculosis was discovered among the contacts in seventy-eight families in which there were children positive to the tuberculin test.

Case-Finding in Related Families. It is an established fact that the family contact makes an important contribution to the incidence of active disease in the community. It has been noted also that active disease develops most frequently among young adult contacts at the ages when they may be establishing new family units. Consequently it seemed logical to search for cases of active tuberculosis among the close blood relatives of known tuberculous individuals in the district even though the members of the related family do not live in the household of the tuberculous family. Furthermore, in an Italian community such as the Mulberry district, there is frequent visiting among the relatives in the district

[13] In addition, an arrested case of pulmonary tuberculosis with a history of illness five years previous to 1936 was reported by one of the families. There was no record either in the Branch Office or the Central Office of the Bureau of Tuberculosis that the case had ever been reported and so far the diagnosis of pulmonary tuberculosis has not been verified by a clinic examination.

and the contact between the related families may be considered as important.

One hundred and nine families in which there was a blood relative of a tuberculous individual in the community were investigated for tuberculosis. Fifty-two per cent of the 507 individuals in these families had a clinic examination. Three unknown cases of active pulmonary tuberculosis (re-infection type) were discovered among the examined population or a rate of 1.1 per 100.

A brief description of these cases may be of interest: (1) An active tuberculous lesion in the minimal stage was noted in a male (head of household) aged 44. Sputum has remained negative but subsequent X-rays indicate spread of the disease. This individual was examined because he had been in frequent contact with a cousin who died of pulmonary tuberculosis in 1933.

(2) Active tuberculosis in the minimal stage was diagnosed in a female aged 33 (wife in family). Sputum has remained negative. This woman was examined because a twenty-six-year old married sister living in the district had active pulmonary tuberculosis with a positive sputum in 1933 and 1934.

(3) A female aged 60 was examined and diagnosed as probable bronchiectasis. Sputum was negative. Later she went to Columbus Hospital ill with lobar pneumonia and malignancy of the intestinal tract and died there. During her illness, her sputum was found positive for tubercle bacilli. This case was examined because of relationship to a family in which the children were positive to tuberculin.

Case-Finding through Examination of Individuals Who Have Recently Had an Acute Respiratory Illness. At times the onset of secondary tuberculous infection manifests itself as an attack of acute respiratory illness such as pneumonia, pleurisy, or what seems to be influenza. Consequently, it was considered advisable to urge a clinic examination for all adults who had recently had a disabling illness from pneumonia, pleurisy, influenza, or acute bronchitis. Cases in the district given nursing care by the Henry Street Nursing

Service for any of these diseases were promptly reported to the Mulberry Health Center for follow-up after recovery. When the Health Center nurses visited these families a history of symptoms and of illness suffered by other members of the family was secured. All members of the family with suggestive history of illness or symptoms were urged to have a clinic examination.

During 1935 and 1936, 157 persons, or 49 per cent of the members of sixty-two families carried because of a case of acute respiratory illness, were examined at Washington Clinic. One case of active re-infection type tuberculosis in the minimal stage was discovered in an eighteen-year old girl, or a rate of 0.63 per 100 persons examined. It is of interest to point out the fact that in 1934 this particular case had been employed as a houseworker in a family in the district where the wife was ill with infectious tuberculosis.

The results of the three methods of case-finding, a tuberculin survey of grade school age children and examination of family contacts of the positive reactors, examination of blood relatives of tuberculous families, and examination of individuals with a history of recent attack of acute respiratory disease, are summarized briefly in Table 5. It is of interest to note that the examination of family contacts of positive reactors discovered through the tuberculin testing survey of grade school children was the least productive method

Table 5. Results of three case-finding methods in Mulberry district.

Class	Active Case Rate per 100 Persons Examined	Number of		Number of Families
		Cases of Active Secondary Infection	Family Members Examined	
Tuberculin Testing Survey	0.4	1	223	78
Related Families	1.1	3	264	109
Individuals with Recent Attack of Acute Respiratory Illness or Suspicious Symptoms	0.6	1	157	62

of finding new active cases of re-infection type tuberculosis. The rate, 1.1 per 100, among members of families related to a tuberculous individual is almost three times the rate 0.4 noted among contacts of positive reactors and approximately twice as high as the rate of active disease discovered among individuals with a recent attack of acute respiratory disease or suspicious history. The fact that four of the five cases of re-infection type tuberculosis discovered by these methods were classed in the minimal stage when diagnosed is also of interest.

CASE-FINDING AMONG CONTACTS IN TUBERCULOUS FAMILIES

Examination of family contacts in the known tuberculous families is an accepted procedure in the control of tuberculosis. The need for periodic re-examination and case-finding in these families may best be illustrated by showing the actual incidence of active adult pulmonary tuberculosis (re-infection type) among the contacts. Close observation, both by the clinic and by the nursing service, in 385 tuberculous families in the Mulberry Health Center district makes it possible to note with a reasonable degree of accuracy the occurrence of clinically active disease among the family members during the two years of intensive service, 1935 and 1936.[14]

The families are classified according to the type of index case in the family. The index case is the case which formed the basis of selection of the family for intensive service. Thirty-seven families were carried because of a death from pulmonary tuberculosis which had occurred sometime during the period 1928-1934. No cases of active clinical tuberculosis were present in these families when the special tuberculosis study was started. In thirty-five families the index case in each was one of active clinical pulmonary tuberculosis

[14] Periodic re-examination of a high proportion of the family contacts makes it possible to report that all of the cases of clinically active disease which occurred among contacts during the two years 1935 and 1936 were individuals classed as negative on previous examinations. It is believed that the chances of missed cases with clinical symptoms among the unexamined contacts are relatively slight. These families have been visited by the nurses on the average from twelve to seventeen times a year and the nurses usually know of any illness, suspicious or otherwise, in the family.

Class	37 Families Index Case Death From Pulmonary Tuberculosis 1928–1934	35 Families Index Case Active Pulmonary Tuberculosis 1935	64 Families Index Case Arrested Pulmonary Tuberculosis	249 Families Index Case Child With Primary Infection
Total Persons	181	165	301	1,559
Per Cent Examined	71.0	79.4	77.1	75.3

Table 6. Per cent of household contacts examined in 385 families, classified according to the type of index case and observed during 1935 and 1936 in the Mulberry Health Center district, New York.

(re-infection type). Sixty-four families were carried because some sign of healed re-infection type tuberculosis was noted on the chest X-ray of an individual in the family. In 249 families the index case was a child with a lesion of primary infection revealed either by a chest X-ray or by a positive reaction to the tuberculin test.

Table 6 shows the total household contacts and the proportion examined. In the four groups of families the proportion examined ranges from 71 per cent of the household contacts in families where a death from pulmonary tuberculosis had occurred to 79 per cent of the contacts in families where the index case was one of active clinical disease.

Table 7 shows the number of families in each group in which there were children in the family under 15 years of age and the proportion of the children tested and the proportion for whom a positive reaction to tuberculin was noted. The rate of infection, 83.9 per 100, was highest in families carried for close observation because of a death from pulmonary tuberculosis. In the other three groups of families the rates were similar, ranging from 43.2 among children in the families where the index case was one of active pulmonary tuberculosis to 47 and 48 per 100 in families where the index case was either an arrested case of re-infection type tuberculosis or a case of primary infection in a child. It is interesting to note that the infection rates in the latter three groups of families were not significantly higher than the estimated average rate of 36 per 100 noted

Classification as to Tuberculin Test	23 Families Index Case Death from Pulmonary Tuberculosis 1928–1934	21 Families Index Case Active Pulmonary Tuberculosis 1935	48 Families Index Case Arrested Pulmonary Tuberculosis	249 Families Index Case Child With Primary Infection
Total Children 0–14 Years of Age	53	54	133	711
Per Cent Tested with O.T.	66.0	86.3	92.1	90.9
Per Cent Positive to Tuberculin	83.9	43.2	47.9	46.6
Per Cent Positive Adjusted for Age[1]	82.4	43.2	48.3	46.3

[1]Rates adjusted to age distribution of children 0–14 years of age in the total 341 families.

Table 7. Per cent of children (0-14 years of age) positive to the intracutaneous tuberculin test in 341 families, classified according to the type of index cases, observed during 1935 and 1936 in the Mulberry Health Center district.

on the tuberculin testing survey of children of the same ages in the three public schools of the district.[15]

Table 8 shows the incidence of active pulmonary tuberculosis (re-infection type) among contacts in each of the four groups of families during the two years 1935-1936.[16] No cases of active adult pulmonary tuberculosis occurred among the contacts in the sixty-four families in which the index case was an individual found to have X-ray evidence of a healed pulmonary lesion (re-infection type). The incidence of active disease among contacts in the thirty-seven families observed because of a death from adult pulmonary tuberculosis (2.0 per 100) was more than forty times the incidence

[15] In the families observed because of an active case of adult pulmonary tuberculosis, twenty of the thirty-five index cases were known to have positive sputum; in those observed because of a death from pulmonary tuberculosis the assumption is that practically all the index cases had positive sputum; in the families observed because of arrested pulmonary tuberculosis, there was no history of illness from tuberculosis except for two of the index cases. One of these was known to have had a positive sputum.

[16] In all families in each group the index case which formed the basis of selection of the family is excluded from the observed population.

Class	37 Families Index Case Death from Pulmonary Tuberculosis 1928-1934	35 Families Index Case Active Pulmonary Tuberculosis 1935	64 Families Index Case Arrested Pulmonary Tuberculosis	249 Families Index Case Child with Primary Infection
Active Pulmonary Tuberculosis—Rate per 100 Person Years	2.0	0.3	0	0.03
Number of Cases of Active Pulmonary Tuberculosis	7	1	0	1
Population Observed (Person Years)	343	320	580	2,862

Table 8. Incidence of active tuberculosis during 1935 and 1936 among family contacts in 385 families classified according to the type of index case, in the Mulberry Health Center district of New York.

(0.03 per 100) observed in the 249 families carried because of a case of primary infection. In the families with an active case of adult pulmonary tuberculosis the rate of occurrence of active re-infection type disease, 0.3 per 100 persons observed, was also considerably higher than the rate among household contacts in the 249 families observed because of a child with primary infection.[17] It may be concluded from these data, even though limited to a short period of observation, that it is exceedingly important to follow and periodically re-examine the household contacts in families where there is or has been a case of active pulmonary tuberculosis.

The wisdom of continued close observation of families selected

[17] It would be more suitable to show the incidence of secondary cases of active adult pulmonary tuberculosis for the two groups of families (thirty-seven families, index case death from pulmonary tuberculosis and thirty-five families, index case active adult pulmonary tuberculosis) combined since both groups are comparable. However, it is desired to emphasize the need for continued supervision of the contacts in families where a death from tuberculosis has occurred.

If the two groups are combined, the average annual incidence of active disease is 1.2 per 100 person years. This rate, though covering a period of only two years, is similar to the rate noted by Downes in eighty-three tuberculous families in Cattaraugus County and by Putnam in some 500 families in Philadelphia.

Downes, Jean: A Study of the Risk of Attack among Contacts in Tuberculous Families in a Rural Area. *The American Journal of Hygiene*, November, 1935, 22, No. 3.

Putnam, Persis: Tuberculosis Incidence among White Persons and Negroes Following Exposure to the Disease. *The American Journal of Hygiene*, November, 1936, 24, No. 3.

on the basis of an individual with X-ray evidence of healed lesions of re-infection type tuberculosis and no history of illness from the disease, for the purposes of case-finding, may be questioned. There is no indication of an unusual amount of tuberculous infection among the children under 15 years of age in these families and there are no cases of healed re-infection type lesions among the examined contacts. However, it may be of interest for the purposes of special study to follow the index cases for a period of years in order to see whether any of them become reactivated or break down with clinical disease. It will also be of interest to follow the 249 families in which the index case was a child with primary infection over a longer period of time but it should be emphasized that families in this class do not need the close public health supervision that families with exposure to active adult pulmonary tuberculosis require.

VOLUME AND COST OF TUBERCULOSIS SERVICE IN MULBERRY DISTRICT

The volume of tuberculosis service, both clinic and nursing care, in the Mulberry district has shown an increase in 1936 contrasted with 1935. During 1935, 521 families were supervised by the nurses of the Center because of a tuberculosis problem or for case-finding; in 1936 a total of 830 families had some nursing service. The increase in 1936 is due largely to the addition to the case-load of families in which one or more children were found positive to the tuberculin test through a survey of grade school age children in the public schools of the district during that year.

Clinic service, also, increased in volume in 1936. In 1935, 1,243 persons referred by the Health Center were examined at Washington Clinic; in 1936, 1,587 persons were examined, or an increase of 28 per cent over the number examined in 1935. In 1935, the 1,243 persons made 2,991 clinic visits, or an average of 2.4 visits per person, contrasted with 2.1 visits per person in 1936. Seven hundred and seven X-rays of Mulberry patients were taken in 1935 compared with 1,029 in 1936; this represents an increase of 46 per cent.

It is of considerable interest to know how much it costs to give an intensive service to tuberculous families in a congested district of a large city. Furthermore, it is of interest to see the volume of service given to various groups of families and this analysis can be presented most strikingly when put on a cost basis.[18]

In order to make a critical appraisal of volume of service on a cost basis, it is necessary to group the families served by the Health Center and the clinic according to the importance of the tuberculous problem in the family or the initial reason for going into the family. Table 9 shows the cost to Mulberry Health Center of their service during 1935 and 1936 in the families grouped according to the index case, which indicates the initial reason for giving tuberculosis service to the family. The population base used in the analysis of cost by family groups is expressed in units of time, instead of numbers of families; that is, a month of service for each family is the unit of time. Such a procedure eliminates the bias which would be introduced if individual families carried for various time periods were given equal weight.[19] Only in this way can the cost data be used to show accurately how expensive it is to supervise groups of families, and also where the service has been concentrated.[20]

Table 9 shows that service for the various groups of families cost

[18] Beginning January 1, 1935, detailed daily records of time in hours and minutes were kept by the nurses so that it is possible to know how much time was spent on each family during the year. The system of time-keeping was worked out by Dr. Gwendolyn H. Berry, statistician of the New York Association for Improving the Condition of the Poor.

[19] For example, the nursing visits per month of care per family gives a more accurate picture of service than the average number of nursing visits per family, when some families may have been carried two months, three months, six months, or nine months, during the year.

[20] The method of arriving at the amount of money spent on the various groups of families by Mulberry Health Center is as follows: Seventy-one per cent of the money paid out for house, general, clerical, and statistical expenses was allocated to tuberculosis work. Also two-thirds of the expense of supervision and one-half the cost of a nutritionist were allocated to tuberculosis work in 1935. The procedure was the same for 1936 except that the percentage of the costs allocated to tuberculosis was 82 instead of 71. (The preschool clinic run by the Mulberry Health Center was taken over by the Department of Health in 1926.)

Data of nurses' time were tabulated for the different groups of families. Money spent on tuberculosis work was allocated to families on the basis of the amount of time and service given to those families during the year.

Classification of Families	Number of Families	Months of Service	Money Spent by Mulberry Health Center	Cost per Month of Service per Family	Cost per Family per Year
	1935				
Total Families—All Classes	521	5,309	$21,983.35	$4.14	$49.68
Index Case—Death from Pulmonary Tuberculosis	51	350	1,099.17	3.14	37.68
Index Case—Active Pulmonary Tuberculosis	39	295	1,824.62	6.19	74.28
Index Case—Arrested Pulmonary Tuberculosis	58	539	1,868.58	3.47	41.64
Index Case—Primary Infection in a Child	249	2,960	13,365.88	4.52	54.24
Index Case—Non-pulmonary Tuberculosis	17	161	549.58	3.41	40.92
Index Case—Blood Relative of Tuberculous Family	75	730	2,176.35	2.98	35.76
Index Case—Individuals with Recent Attack of Acute Respiratory Disease	32	274	1,099.17	4.01	48.12
	1936				
Total Families—All Classes	830	6,289	$24,935.54	$3.96	$47.52
Index Case—Death from Pulmonary Tuberculosis	46	407	1,246.78	3.06	36.72
Index Case—Active Pulmonary Tuberculosis	44	391	2,069.65	5.29	63.48
Index Case—Arrested Pulmonary Tuberculosis	56	523	2,119.52	4.05	48.60
Index Case—Primary Infection in a Child	517	3,686	15,160.80	4.11	49.32
Index Case—Non-pulmonary Tuberculosis	19	161	623.39	3.87	46.44
Index Case—Blood Relative of Tuberculous Family	94	778	2,468.62	3.17	38.04
Index Case—Individuals with Recent Attack of Acute Respiratory Disease	54	343	1,246.78	3.63	43.56

Table 9. Cost of service given by Mulberry Health Center to families classified according to the index case in the family, 1935 and 1936.

from $36.72 to $63.48 per family per year during 1936. The families in which the index case was one of active pulmonary tuberculosis received the most intensive service in both years; the cost per family

per year was $74.28 in 1935 and $63.48 in 1936. Families carried because of a death from pulmonary tuberculosis which occurred during 1928-1934 received the least service of any group of families. It is quite reasonable and logical that families in which there is a known active case of pulmonary tuberculosis (re-infection type) should receive special emphasis. However, in view of the fact that families carried because of a death from pulmonary tuberculosis had a very high incidence of active adult pulmonary tuberculosis, they too should receive special emphasis.

Table 10 which shows the percentage difference in the amounts of service given to each group of families compared with those carried because of a death, indicates even more strikingly where the emphasis in the tuberculosis work has been placed. Families in which the index case was arrested pulmonary tuberculosis received from 10 to 32 per cent more service in 1935 and in 1936 than did families in which the index case was a death; families in which the index case was primary infection in a child (childhood type or a

Table 10. Comparison of annual cost per family in the different groups with cost for families in which the index case was a pulmonary tuberculosis death.

Classification of Families	Amount the Annual Cost per Family in Each Class Exceeded the Cost for Families in which Index Case was a Pulmonary Tuberculosis Death		Per Cent Excess[1]	
	1935	1936	1935	1936
Total Families—All Classes				
Index Case—Death from Pul. Tb.				
Index Case—Active Pul. Tb.	$+36.60	$+26.76	+97.1	+72.9
Index Case—Arrested Pul. Tb.	+ 3.96	+11.88	+10.5	+32.4
Index Case—Primary Infection in a Child	+16.56	+12.60	+43.9	+34.3
Index Case—Non-Pulmonary Tb.	+ 3.24	+ 9.72	+ 8.6	+26.5
Index Case—Blood Relative of Tuberculous Family	− 1.92	+ 1.32	− 5.1	+ 3.6
Index Case—Individuals with Recent Attack of Acute Respiratory Disease	+10.44	+ 6.84	+27.7	+18.6

[1]Minus means cost was less than in families in which the index case was a death from pulmonary tuberculosis.

Classification of Families	Number of Families	Months of Service Given to Families	Estimated Cost of Clinic Service	Cost per Month of Service per Family	Cost of Clinic Service per Family per Year
	1935				
Total Families—All Classes	521	5,309	$3,017.12	$0.57	$6.84
Index Case—Death from Pulmonary Tuberculosis	51	350	232.44	0.66	7.92
Index Case—Active Pulmonary Tuberculosis	39	295	322.58	1.09	13.08
Index Case—Arrested Pulmonary Tuberculosis	58	539	386.66	0.72	8.64
Index Case—Primary Infection in a Child	249	2,960	1,578.04	0.53	6.36
Index Case—Non-pulmonary Tuberculosis	17	161	87.44	0.54	6.48
Index Case—Blood Relative of Tuberculous Family	75	730	239.84	0.33	3.96
Index Case—Individuals with Recent Attack of Acute Respiratory Disease	32	274	170.12	0.62	7.44
	1936				
Total Families—All Classes	830	6,289	$3,460.44	$0.55	$6.60
Index Case—Death from Pulmonary Tuberculosis	46	407	140.46	0.34	4.08
Index Case—Active Pulmonary Tuberculosis	44	391	218.36	0.56	6.72
Index Case—Arrested Pulmonary Tuberculosis	56	523	340.08	0.65	7.80
Index Case—Primary Infection in a Child	517	3,686	2,377.40	0.64	7.68
Index Case—Non-pulmonary Tuberculosis	19	161	75.80	0.47	5.64
Index Case—Blood Relative of Tuberculous Family	94	778	175.12	0.22	2.64
Index Case—Individuals with Recent Attack of Acute Respiratory Disease	54	343	133.22	0.39	4.68

[1]The cost of clinic service for each group of families is based on the actual number of clinic visits made by individuals in the families in each group and the number of X-rays taken of individuals in each group. The Department of Health estimated the cost of a clinic visit without X-ray as $.90 and with X-ray as $1.36.

Table 11. Cost of clinic service for families in the Mulberry district classified according to the index case in the family, 1935 and 1936.[1]

positive reactor) received from 34 to 44 per cent more service. In

many of the families carried by Mulberry Health Center during the two years, case-finding has been the main objective. The results so far indicate the advisability of a shift in emphasis, that is, less service in certain groups of families and more service in others.

The cost of clinic service per family per year is shown in Table 11 for each group of families. The costs per family during 1935 ranged from $3.72 per family where the index case was a blood relative of a tuberculous individual to $13.08 per family where the index case was one of active pulmonary tuberculosis. During 1936 the costs per family ranged from $2.64 for families where the index case was a blood relative of a tuberculous family to $7.80 for families where the index case was one of arrested tuberculosis. In general the clinic costs per family were lower for all family groups in 1936 than in 1935, the one exception was in families where the index case was one of primary infection in a child; these families received more clinic service in 1936 than in the previous year. There was a marked decrease in clinic service per family in those in which a death occurred and in families carried because of an active case of tuberculosis. When the examination of a high proportion of the contacts has been attained, the cost of clinic service per family per year will over a period of years decrease unless an arbitrary routine for the re-examination of family contacts be laid down and strictly adhered to.[21]

ACCOMPLISHMENT IN CERTAIN PROCEDURES

One of the important procedures for the control of tuberculosis is the examination of family contacts. Securing examination of contacts in the Mulberry district has been the responsibility of the nurses of the Health Center. The effectiveness of their work in this respect is revealed by the extent to which the family contacts in certain of the tuberculous families have been examined. These data

[21] The policy of the Bureau of Tuberculosis is that recommendation for re-examination be left largely to the discretion of the clinic physician and the frequency of re-examination is generally governed by the condition of the patient at the time of examination and the nature of his contact with tuberculosis.

Age Groups	Total Contacts	Per Cent of Contacts Examined		
		By January 1, 1935	By December 31, 1935	By December 31, 1936
	35 families—index case—active pulmonary tuberculosis—January 1, 1935			
All Ages	165	58.8	77.0	79.4
0–9	26	65.4	92.3	96.0
10–19	48	68.7	83.3	86.4
20–29	31	48.4	71.0	74.2
30+	56	53.6	69.6	70.6
Unknown Age	4			
	37 families—index case—pulmonary death—prior to January 1, 1935			
All Ages	181	49.7	64.1	71.0
0–9	25	60.0	80.0	85.7
10–19	62	58.1	74.2	78.2
20–29	41	31.7	43.9	59.5
30+	53	49.1	60.4	65.3
Unknown Age	0			
	64 families—index case—arrested case of pulmonary tuberculosis[1]			
All Ages	301	46.8	64.8	77.1
0–9	68	45.6	75.0	89.1
10–19	116	55.2	71.6	82.1
20–29	38	42.1	52.6	62.9
30+	77	39.0	51.9	64.2
Unknown Age	2			
	184 families—index case—primary infection[2]			
All Ages	1,169	55.5	67.6	78.8
0–9	310	56.5	74.5	91.1
10–19	413	63.9	76.0	86.8
20–29	112	46.4	49.1	58.7
30+	334	47.3	56.9	63.8

[1]Diagnosed as arrested prior to January 1, 1935.
[2]Positive reaction only, or positive reaction to O.T. and lesion of primary infection in a child noted before January 1, 1935.

Table 12. Per cent of contacts examined during stated periods in 320 families classified according to type of index case in the family Mulberry Health Center district, New York.

are shown in Table 12. The 320 families are classified in four groups

according to the type of index case in the family which indicates the reason the family was carried for intensive supervision and study. The per cent of contacts examined in the various groups of families is shown by age for successive time periods during 1935 and 1936. From 71 to 79 per cent of all family contacts in the 320 families had an examination by the end of 1936. This is a higher record of achievement than is usually attained in the examination of contacts in tuberculous families. From 86 to 96 per cent of the children under 10 years of age had an examination; somewhat smaller proportions of those 10-19 years of age were examined. In general the age group 20-29 showed the lowest proportion of contacts examined. These are the ages when examination is exceedingly important because tuberculosis occurs most frequently at this period. In the future more emphasis should be placed on securing examination of these young adults even though they are the most difficult to reach.

An important point illustrated by Table 12 is the fact that it takes more than one year of intensive nursing service to secure a high proportion of contact examinations. For example, in 1935 there were sixty-five new families opened for supervision because of a case of primary infection; by the end of 1936, 64 per cent of the contacts had been examined. During the same year thirty-two new families were opened for supervision because of a case of pulmonary tuberculosis and by the end of 1936 only 54 per cent of the contacts were examined. The proportion of contacts examined in these new families, with a possible period of service varying from twelve to twenty-four months, is equal to the best recorded accomplishment in the examination of contacts.[22] However, even better results

[22] In the Bellevue-Yorkville district, 54 per cent of the contacts in forty-three families in which the primary case was adult pulmonary tuberculosis was examined. *See:* Downes, Jean and Barnard, Margaret Witter: Tuberculosis Administration in the Bellevue-Yorkville Health Center District of New York City. The Milbank Memorial Fund *Quarterly*, July, 1936, xiv, No. 3, pp. 242-257.

In Cattaraugus County 62 per cent of the contacts in 118 families in which there was an active case of tuberculosis was examined. *See:* Downes, Jean: A Study of the Effectiveness of Certain Administrative Procedures in Tuberculosis Control. The Milbank Memorial Fund *Quarterly*, October, 1936, xiv, No. 4, pp. 317-327.

Age Groups	Total Contacts Examined	Number of Examinations in 1935				Number of Examinations in 1936			
		None	One	Two	Three or More	None	One	Two	Three or More
	37 families—index case—pulmonary death which occurred prior to January 1, 1935								
0–19 Years	69	13	29	21	4	34	17	10	8
20 Years and Over	53	20	17	8	4	32	16	5	0
	35 families—index case—active pulmonary tuberculosis January 1, 1935								
0–19 Years	69	9	13	26	19	19	17	16	17
20 Years and Over	60	14	26	13	7	30	17	8	5
	64 families—index case—arrested adult pulmonary tuberculosis January 1, 1935								
0–19 Years	166	28	51	50	20	48	28	51	39
20 Years and Over	71	26	21	11	5	31	26	11	3

Table 13. Frequency of clinic examinations during 1935 and 1936 among contacts in 136 tuberculous families in the Mulberry district. (Families classified according to the index case in the family.)

might be obtained and more rapidly if the private physician and the clinic physician will take more responsibility in teaching the patient the importance of the examination of the family contacts.

The frequency of the examination of family contacts in these families during 1935 and 1936 is of considerable interest and is shown for each of the first three groups of families in Table 13. In each group ([1] families in which the index case was a death from pulmonary tuberculosis, [2] families in which the index case was active pulmonary tuberculosis, [3] families in which the index case was arrested tuberculosis), individuals under 20 years of age have been examined with greater frequency in both years than have adults over that age. On the whole, contacts in the families carried because of a death from pulmonary tuberculosis were examined

less frequently during the two-year period than the contacts in the other two groups of families. In the families carried because of an active case the majority of the examined contacts under 20 years of age had two or more examinations a year. Certainly the frequency of examination of contacts in all of these groups of families indicates that many of the examined contacts have been kept under close observation by the clinic. This reflects an interest on the part of the clinicians and intensive service by the nurses.

An indication of the intensive service given by the nurses to the families in the Mulberry district may be revealed by the frequency of nursing visits. Table 14 shows the number of nursing visits per family per year based on months of service and number of visits in 1936 for families classified according to the index case. Families in the various groups received from twelve to seventeen visits per year

Table 14. Number of visits per family made by the nurses in the Mulberry district during 1936. (Families classified according to the index case in the family.)

Classification of Families	Number of Months of Service	Number of Visits Made by Nurses[1]	Number of Nursing Visits per Month of Service per Family	Number of Visits per Family per Year
Total Families—All Classes	6,289	7,405	1.18	14.2
Index Case—Death from Pulmonary Tuberculosis	407	408	1.00	12.0
Index Case—Active Pulmonary Tuberculosis	391	567	1.45	17.4
Index Case—Arrested Pulmonary Tuberculosis	523	639	1.22	14.6
Index Case—Primary Infection in a Child	3,686	4,466	1.21	14.5
Index Case—Non-pulmonary Tuberculosis	161	191	1.19	14.3
Index Case—Blood Relative of Tuberculous Family	778	757	1.00	12.0
Index Case—Individual with Recent Attack of Acute Respiratory Disease	343	377	1.10	13.2

[1]Visits include home visits, office visits, and visits on behalf of patients.

of service; the average for all classes was fourteen visits per year. Families in which there was a case of active adult pulmonary tuberculosis received the most intensive service in terms of visits. It may be recalled that when time consumed by visits is taken into account, as shown in the tables dealing with cost of service, the emphasis placed on families with active tuberculosis is even more marked.

CONCLUSIONS

A more complete understanding of the problem of tuberculosis in the Mulberry district has been gained during the two years of special study. The need for better control of the disease is not confined to the Italian families constituting the major proportion of the population, for tuberculosis in a floating population in the lodging houses of the district contributes considerably to the mortality.

The experiments in case-finding have revealed the fact that unknown cases of active adult pulmonary tuberculosis are not easily discovered even in a congested area of a large city where the mortality from the disease is relatively high. A comparison of the effectiveness of the three methods of case-finding experimented with indicates the unsuitability of at least one of them, tuberculin testing of grade school children, for this particular area. Examination of the blood relatives of known tuberculous individuals is a logical procedure, especially when the contact has been frequent. The examination of individuals who have had a recent attack of the more serious acute respiratory diseases needs more study as a case-finding measure. Both of these methods need greater refinement through more careful discrimination as to individuals selected for examination.

The observed incidence of active pulmonary tuberculosis (secondary infection) among contacts in tuberculous families during the past two years in the Mulberry district confirms the soundness of the public health policy of close supervision of families in which there is or has been recently a case of active disease. In fact, the data

concerning the various methods of case-finding indicate clearly the need for a more selective service in tuberculosis control, a service concentrated on active pulmonary cases and their immediate contacts.

The analysis of the volume of service on the basis of cost for the families grouped according to the tuberculosis problem in them when related to the need for service indicates that a shifting of emphasis in the future program of tuberculosis work in this area is desirable. The service has been too intensive in families where the problem is not acute.

The accomplishment of the Health Center in respect to the examination of contacts in the tuberculous families of the district is evidence of what can be done through intensive service. A high proportion of the contacts have been examined and have been kept under close clinic supervision.

In conclusion it should be stated that the purpose of the special tuberculosis study in the Mulberry district is to evolve a program for better control of the disease in a congested area of a large city, a program which will be suitable for the use of public health agencies. Experimentation must be the dominant motive in the study and a critical appraisal of results from time to time is essential.

REPLACEMENT RATES IN THE PRODUCTIVE AGES

by T. J. Woofter, Jr.[1]

WHEN facts are desired which are pertinent to such questions as the present rate of expansion of the labor supply, the expansion in demand for housing, the probable expansion of the market for other commodities with relatively inelastic demand, or the actual volume of the youth problem—students often turn to the total increase of the population. This is a crude measure at best since it is possible for the rate of total population increase to slacken and the rate of increase of middle age groups to remain constant or to rise. Increase by births is not effective for eighteen or twenty years in the form of maturing adults and, while some deaths over 65 represent losses of active members of the labor market, others represent losses of people who have previously retired.

The change, in any particular year, in the number of persons in the productive age groups is due to the survivals from births in past years to the first year of productive age, less the deaths within the productive ages during the current year, less the number who pass annually beyond the last year of productive age. This is the replacement rate due solely to excess of maturities over deaths and senescence and for a particular geographic area ignores any changes attributable to migration.

We, therefore, suggest as a more refined measure of increase in workers at a particular time the use of the rate of replacement of productive persons. This is illustrated in this article chiefly by analysis of the farm population. The replacement rate used is the annual increase in the number of males 18 to 65 years of age.[2] The use of

[1] Coordinator of Rural Research, Works Progress Administration, Washington, D. C. The author is indebted to J. E. Hulett, Jr., and Franklin Aaronson for aid in methods of computation.

[2] These ages were used as approximate average ages of entry and retirement from farming.

the ages 18 and 65 is somewhat arbitrary but not entirely so since evidence indicates that these are roughly the average entrance and retirement ages for farmers. The determination of the most significant age grouping for use in the non-farm groups and in cities would require considerable research.

The effective increase of the rural farm group may be calculated in several ways. At the time of a census enumeration the number of persons 65 years of age may be subtracted from the number of persons 18 and the result further reduced by the deaths between 18 and 65 during the year. The result will be the annual increment in the working group which may be converted to a rate simply as percentage increase of the age group 18 to 65 or as ratio of maturities to deaths and senescence. For comparison with other rates such as the rate of natural increase the per cent increase of males 18 to 65 years of age is preferable. In other words just as reproductive rates represent the extent to which daughters replace mothers so male replacement rates may be considered as the rate at which sons replace fathers.

Specifically, the factors expressed in the replacement rate are (a) survivals from births eighteen years before, (b) deaths between 18 and 65 during the current year, and (c) the proportion of the population between the ages of 18 and 65 upon which the rate of death and senescence operates. If, in addition, the rate is applied to males only, then the sex ratio affects the rate since births are usually fairly closely balanced between the sexes and maturities will have a balanced ratio whereas deaths and senescence would apply to the segment of the population with the unbalanced ratio.

For past periods, the rate of increase in the age group can be calculated as of the date of enumeration of each census by the above method. It is not possible to use the actual enumerated increase from one census to another in the group 18 to 65 as this is disturbed by migration. The comparison of the male replacement rate in the rural farm population in 1920 and 1930 is shown in Table 1.

From Table 1, it is evident that although the rate of natural increase was beginning to slacken, the lower rate had not been operative long enough to affect the productive age levels. In fact increase in the productive ages was still climbing. This is owing, probably, to the more rapid decline in the number of deaths of the middle age groups than there had been in the number of births from 1902 to 1912.

Table 1. Replacement rate of males in the rural farm population, 1920 and 1930.

Item	1920	1930
18 Years of Age	336,827	363,793
65 Years Plus Deaths 18 to 65[1]	160,165	162,390
Difference	176,662	201,403
Age Group 18–65	8,424,907	8,360,946
Annual Replacement Rate	2.10	2.41

[1]Age specific death rates from Dublin, Louis I.: *Length of Life*, page 91, applied to 1920 and to 1930 ten-year age groupings.

It is apparent that at the beginning of the depression farm youth were entering the productive age groups at the rate of about 200,000 per year faster than these age groups decreased by death and old age, i. e., without cityward migration the rural farm group 18 to 65 would have increased by about 1,000,000 between 1930 and 1935. This is in essence the measure of the pressure of population on agriculture during the depression. It is a measure of the volume of the youth problem in the rural farm population. With estimates of the type of those of Thompson and Whelpton[3] at hand, however, future projections can be made. Projection for eighteen years in the future carries a high degree of accuracy since the effective replacements for that period are already born.

The change in this replacement rate in the rural farm population is projected to 1955 in Table 2 by the use of Thompson and Whelpton's age group survival tables corrected to correspond to the enumerated farm population in 1935. Having distributed the farm population as enumerated in 1935 by sex, as in 1930, and by age, as in Thompson and Whelpton's estimates, this population is

3 Published in a mimeographed bulletin of the National Resources Board, "Estimates of Future Population, by States"—a series of tables prepared by Warren S. Thompson and P. K. Whelpton, December, 1934.

Year	Average Population 18–65 Years of Age (Thousands)[1]	Average Annual Increase (Thousands)	Annual Replacement Rate	Estimated Increase in Total Population
1935–1939	9,762	225.6	2.31	1.53
1940–1944	10,813	195.0	1.80	1.45
1945–1949	11,710	163.6	1.40	1.35
1950–1954	12,557	176.0	1.40	1.16

[1]The farm population as enumerated in 1935 was distributed by sex according to the sex ratio of the 1930 population and by age according to the age group distribution estimated by Thompson and Whelpton.

Table 2. Replacement rate of males in the rural farm population, 1935-1955.

projected to 1955 by the age group survival method and the per cent increase in the group 18 to 65 calculated. This gives a quinquennial replacement rate of which the average is approximately the annual replacement rate at the middle of the quinquennium.

Although maturities had been increasing from 1920 to 1930 the trend reversed after 1935 and it is apparent from Table 2 that the future course of the increase in the productive ages is sharply downward until about 1947 when it levels off.

Table 3. Replacement rate of males in the rural farm population, 1930 (selected states).[1]

State	Annual Replacement Rate
United States—Total	2.41
North Carolina	3.64
Kentucky	2.42
North Dakota	2.88
Utah	3.08
Indiana	1.22
Ohio	1.12
Vermont	.81

[1]Ages 18 to 65 from *Fifteenth Census of the United States: 1930.* Deaths between 18 and 65 obtained by rates from Dublin, Louis I.: *op. cit.*, page 350.

Expressed in actual numbers, this means that in twenty years, assuming no resumption of migration to cities, the present generation of rural farm population will mature 3,800,000 youth in excess of the losses in the 18 to 65 group in spite of the rapid fall in the rate of natural increase.

The varying geographic incidence of this youth pressure as measured by the replacement rate is indicated by comparison of the 1930 replacement rates for selected states (Table 3) and by states

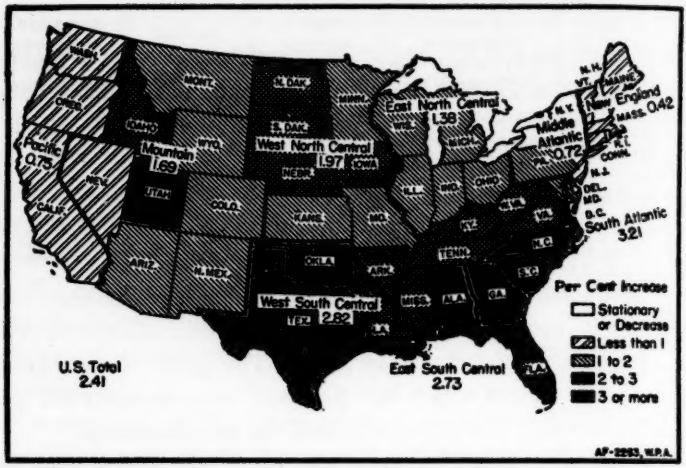


Fig. 1. Replacement rates of males 18 to 65 years of age in the rural farm population, by regions and by states, 1930.

and regions for the entire country (Figure 1). It will be noted that the two states of North Carolina and Kentucky in the Appalachian Area have rates as high as those of the western states, Utah and North Dakota. The states of Vermont, Ohio, and Indiana where the falling birth rate is of relatively earlier incidence already have low replacement rates.

The difference in the replacement rate and the rate of natural increase may be illustrated by data for the total United States given in Table 4. It will be observed that while the rate of natural increase dropped 26 per cent from 1920 to 1930 the male replacement rate did not change markedly. The 1920-1930 decline in natural increase will show in the replacement rates from 1938 to 1948 pro-

Table 4. Rate of natural increase and replacement rate of males, per 100 for the United States total population, 1920 and 1930.

	1920[1]	1930[1]
Rate of Natural Increase	0.99	0.73
Rate of Male Replacement	1.21	1.17

[1]Rates of natural increase per hundred from Thompson, Warren S.: *Population Problems*, p. 242. 1920 = 1918–1922 average, 1930 = 1928–1932 average. Male replacement rate calculated as in Table 1.

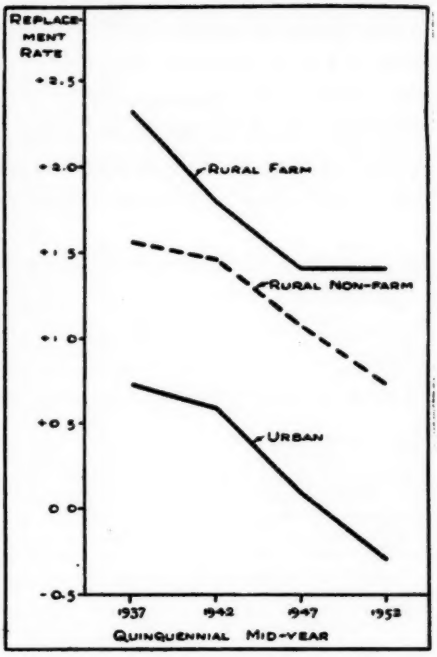
Population	Quinquennial Mid-Year			
	1937	1942	1947	1952
Urban	.72	.59	.09	−.30
Rural Non-Farm	1.56	1.46	1.07	.73
Rural Farm	2.31	1.80	1.40	1.40

Table 5. Annual replacement rate of males 18 to 65. (Estimated from Thompson and Whelpton's age survival tables [no interstate migration] at midpoint of five-year period.)

vided there is not an offsetting decline in the death rate, 18 to 65, within that period.

The extent of decline in the replacement rate of males in the population is illustrated in Table 5 and Figure 2 for the United States total by farm, non-farm, and urban groups. Table 6 indicates the projected replacement rate for the United States total farm population and the farm population of eight drought states. Knowledge of the future trends of population in those states is particularly important since many of the rehabilitation measures advocated for the drought states will call for a reduction in, rather than an increase of, population. A question of paramount administrative importance, therefore, is the number of people that will probably be in excess of present needs as a result of the rate of maturity of the children now under 18 years of age. In actual numbers if there is

Fig. 2. Annual replacement rate of males 18 to 65 in rural farm, rural non-farm, and urban populations of the United States. Estimated from Thompson and Whelpton's age survival tables (no interstate migration) at midpoint of 5-year period.



no migration, these drought states will mature over a quarter of a million youth in excess of the losses from the productive age group. However, the rapid decline in the replacement rate indicates that by 1955 the population pressure will be greatly alleviated in most of the states.

Table 6. Annual replacement rate of males in the rural farm population, 1935-1955 in eight drought states and in the United States.[1]

State	Quinquennial Mid-Year			
	1937	1942	1947	1952
United States—Total	2.31	1.80	1.40	1.40
North Dakota	2.23	1.62	1.25	1.22
Montana	1.49	.95	.55	.46
South Dakota	2.17	1.65	1.10	.83
Wyoming	1.33	.84	.61	.52
Nebraska	2.00	1.53	1.07	.77
Colorado	1.82	1.41	.98	.92
Kansas	1.48	1.26	.97	.85
New Mexico	2.28	1.68	1.75	1.85

[1]Age group 18 to 65 projected by Thompson and Whelpton's estimates *op. cit.*, corrected by the 1935 Census.

Such replacement ratios are often more useful as a measure of population increase than net total increases or rates of actual increase, and also they can be calculated for groups for which specific birth and death rates are not available. Any population for which the age distribution and a knowledge of the survival rates are available is subject to such calculation.

EVALUATION OF A RURAL SCHOOL HEALTH EDUCATION PROJECT[1]

I. EVALUATION OF TEACHER'S WORK IN HEALTH EDUCATION

by RUTH M. STRANG,[2] RUTH E. GROUT,[2] AND DOROTHY G. WIEHL[2]

IT is difficult to evaluate a teacher's contribution to the health of his pupils. Not only his methods of instruction but also his personality is involved in effective health teaching. Of these two factors the intangible relationships between teacher and pupil are the more important, for it is these relationships that determine, to a large extent, the child's attitude toward healthful living.

Insofar as the method of teaching is indicative of the personal relationship existing between teacher and pupil (and it is, to some extent), a survey of methods of teaching health education would be enlightening. The best type of survey, however, would include not only written reports made by the teacher, but also observation of pupils and teacher and the interaction between them in the classroom and in other natural situations, interviews with teacher and pupils, examination of medical and educational records, and samples of the children's work.

This article will be confined to a discussion of questionnaires on health teaching activities, given to all teachers in Cattaraugus County, New York, and to a control group of about one hundred teachers in Steuben and Allegany Counties, New York, in an effort to study methods of health teaching. It is the first of a series of

[1] This project has been made possible by grants from the Milbank Memorial Fund. For a description of its development *see* Grout, Ruth E.: A PROJECT IN RURAL SCHOOL HEALTH EDUCATION, Milbank Memorial Fund. The project started in a few schools in September, 1931, and gradually expanded until by September, 1933, practically all of the two hundred and more schools were participating in some way. The evaluation studies were begun in the spring of 1936, and when possible also have been applied in a control group of about one hundred schools in Steuben and Allegany Counties. Appreciation is extended to the district superintendents in both of these Counties who have cooperated in these studies.

[2] Respectively: Associate Professor of Education, Teachers College, Columbia University; Director, School Health Study, Cattaraugus County; Milbank Memorial Fund.

articles dealing with the evaluation of the experimental school health education project in the rural schools of Cattaraugus County. Future articles, although treating other phases of the study, also will reflect indirectly the effectiveness of the teachers' contributions to the health of their pupils. The total number of questionnaires returned in this study was 256—187 from Cattaraugus County and sixty-nine from Steuben and Allegany Counties.

Both groups compare closely in all respects except that Cattaraugus County has an organized school health program including educational features, while Allegany and Steuben Counties have none. The schools used in the study serve a rural farming population and are of the one, two, or three teacher type. Significant school census figures in the three Counties are compared in Table 1.

For the teachers who filled out the questionnaires the district superintendents furnished a general rating of teaching ability. The classification of teachers in Cattaraugus County and in the control counties is shown in Table 2, and the distributions give evidence of the general comparability of the two groups of teachers.

The Kind of Report Made by the Teachers. Near the end of the

Table 1. Significant school census figures in Cattaraugus, Steuben, and Allegany Counties (excluding cities and villages under superintendents).[1]

Items	Cattaraugus	Steuben	Allegany
Total Population[2]	72,874	82,727	38,416
Rural Population (Villages under 2,500)[2]	38,944	43,617	32,518
Number of School Districts	247	332	219
Number of One, Two, and Three Teacher Schools	191	266	175
Total Number of Different Teachers Employed at Any Time During the Year	556	591	481
Licenses Held—Normal Diplomas	231	231	180
Total Number Pupils Registered During the Year	10,912	10,848	8,182
Number of Pupils Completing the Eighth Grade	741	672	531
Total Expenditures for Instructional Service	$659,682.86	$642,905.57	$511,029.74

[1]These figures are taken from the Thirty-First Annual Report of the New York State Education Department, 1935.

[2]Estimate as of July 1, 1936, New York State Department of Health, Division of Vital Statistics.

Classification	Percentage Distribution		Number of Teachers	
	Cattaraugus County	Control Group	Cattaraugus County	Control Group
Total	100.0	100.0	187	69
High	34.1	37.1	62	23
Medium	45.1	33.9	82	21
Below Average	20.9	29.0	38	18
Not Classified			5	7

Table 2. Efficiency ratings by superintendents for teachers returning questionnaires in Cattaraugus County and in control counties.

school year of 1936 the teachers were asked by their district superintendents to answer the following questions:

What health teaching activities have you carried out successfully this year?

Please describe in this space at least one in some detail.

What changes have taken place in the health behavior of your pupils as a result of your health program?

What changes have taken place in the school environment as a result of your health program?

In what ways have you tried to reach the parents in health matters? A brief description and a critical statement of your success in this would be helpful.

What improvements do you plan for next year as a result of your experiences this year?

In general, the questions seem to have been understood by the teachers. There were no irrelevant answers. There were, however, many incomplete answers. Accordingly, the investigators could not judge whether the incomplete answers were due to the fact that the teachers had not carried on the health activity indicated in the questions or to the lack of time to answer the questionnaire, failure to recognize the importance of giving a detailed account of their health work, distaste for writing reports, or other factors.

The Evaluation of the Teachers' Reports. In order to compare the health work of the teachers in the schools having special help in health education with those not having such help, it was neces-

sary to rate each of the teachers' reports as objectively as possible. As a rating by one person is generally considered to have low validity, it was deemed necessary to have the reports rated independently by three persons,[3] all of whom might legitimately be considered experts in health education. The questionnaires were so arranged that the raters had no way of knowing to which groups they belonged.

Seven items of importance in evaluating health instruction were selected as a basis for the ratings:

1. The inclusion of important areas of health knowledge, habits, and attitudes, especially those relating to the prevention of infection, to nutrition, and to good mental hygiene. A teacher whose reports showed that he was giving instruction in these health problem areas would be rated high whereas a teacher whose report indicated that he was devoting all his effort to a single relatively unimportant practice from the standpoint of health, such as brushing the teeth or coming to school neat, would be rated low.

2. Use of real situations and health problems as content of instruction. A high rating would be given to the teacher who showed that he was using the school lunch period and other activities and health problems of the school and neighborhood as health subject matter, while the teacher who seemed to be depending upon artificial situations such as the making of scrap-books, a toy village, health plays, and the like, would be rated low. Actually there might be errors in this rating because what appeared to be an artificial situation might have developed out of a felt need and interest of the children or served as a concrete summary of their study of a vital health problem. The chances are, however, that if the teacher gave no indication in his report that this was the case, he was probably using an artificial type of instruction.

3. Attention to individual health needs and abilities, child initiative, and originality. This was an especially difficult item to rate, for no question dealt directly with this subject. Certain teachers, however, indicated quite clearly that they were aware of individual needs and abilities, while others gave little information from which their point of view

[3] Grateful acknowledgment is made to the assistance of Miss Ethel Mealey, director of a demonstration in health education in Westchester County, and to Miss Verre Johnson, experienced teacher of health, who helped to evaluate the questions. One of the authors (R. H. S.) also rated the teachers' questionnaires.

might be inferred. The small size of the schools suggests at once that all teachers must be aware of the individual pupils. But a very small class does not always guarantee the personnel point of view on the part of the teacher.

4. Types of motivation. Teachers who mentioned as child incentives interest in the solution of a real health problem, social service, and the like, were rated high while those who depended upon such extrinsic rewards as prizes and stars were rated low.

5. Results in terms of health habits, attitudes, and knowledge. The raters had to depend upon the teacher's own statement of his results, and the factor of modesty and difference in desire to make a good impression enters in. However, when concrete evidences of excellent results were indicated, a high rating could be given with considerable assurance.

6. Home cooperation. In this case likewise, the rater was dependent upon the teacher's statement and was aided in his evaluation by concrete illustrations of home cooperation.

7. Plans for the next year. This was an enlightening item which revealed marked differences in teachers. Some teachers with obviously poor programs had no suggestions to make for improvement while others showed that they had evaluated their health work and had better plans for next year. However, the value of this item, for the group as a whole, was reduced by the fact that many teachers were not planning to return to the same school and accordingly had made no plans.

Each item was rated on a five-point scale:

3. Very good practice.
2. Fairly good practice.
1. A little evidence of good work.
0. No evidence given in the questionnaire.
- 1. Harmful features indicated.

A composite rating was made by adding the positive scores on the seven items and subtracting from the sum the minus ratings.

This analytical rating on the seven phases of health instruction made it possible to ascertain whether some groups of teachers were markedly superior in certain respects. For example, the group as a whole seemed to be covering important areas of health knowledge,

habits, and attitudes more effectively than they were using intrinsic incentives. In other words, the teachers seemed more aware of health subject matter than of best methods of motivation.

In addition to this analytical evaluation of the teachers' reports of their health work, a total impression of each teacher's work, obtained from a study of his report as a whole, was made. Such an evaluation is flexible and makes it possible to give credit for certain outstanding features. Moreover, several recent psychological experiments have indicated that an evaluation of a total situation or a total personality may be more accurate and useful than the sum total of the weighted ratings of specific items. As a guide to this evaluation of the questionnaires as a whole, a description of types of programs was prepared ranging from V which includes the features expected in a superior program to I at the other extreme, which not only is lacking in the excellent features but may include certain objectionable procedures. The following scale was presented to the raters:

Not Rated

Inadequate information on all points—no evaluation possible.

Type I

Little or no emphasis is placed upon important health habits and knowledge, instead, some attention is given to the teaching of fallacies and the establishment of undesirable habits.

Health is taught only by the most artificial and formal means.

Pupils are told what to do and what to learn; no evidence is shown of self-direction and pupil initiative.

No indication is given of study of individual, school, or community problems.

No indication is given of the study of health needs of individual pupils or of making provision for them.

No indication is given of the study of group needs with a view to effecting desirable environmental changes.

Prizes and other forms of competition are used for motivation.

No evidence of accomplishment is presented.

No effective plans for the next year are reported.

Type II

Trivial habits and knowledge of little fundamental importance in the promotion of health are emphasized.

Health is taught almost exclusively through formal drills and reading.

Very little or no indication of pupil initiative is presented.

No evidence of problem solving method in which pupils take an active part is reported.

Meager indication is given of appraisal and adjustment of individual pupils.

Little or no reference is made to local school and community problems.

Health instruction is motivated through extrinsic rewards and appeals to self interest, etc.

Program is evaluated in terms of trivial accomplishment.

Slight reference is made to the health values of other school activities.

No personal contacts with parents are reported. Little effort is made to obtain home cooperation.

Plan for the next year shows no advance over the inadequate plan for the past year.

Type III

Certain relatively unimportant areas of health are emphasized to exclusion of more vital phases.

Schoolroom situations used in teaching healthful living are chiefly of an artificial kind, such as posters, plays, etc.

Some indication is given of opportunities for pupil initiative and responsibility.

Interest is shown in having pupils acquire a method of problem solving as well as the knowledge of the best solution of a problem, but little indication is given that the pupils are studying individual, home, and community problems.

Some indication is given of interest in the development and health guidance of individual pupils.

Awareness of the desirability of studying group needs and environmental problems is evidenced, but no indication is given of changes made as the result of the study.

Pupils' interests are motivated by such appeals as the approval of teacher and others.

Some evidence is presented of progress in the formation of desirable habits and knowledge.

Health is related to other subject matter fields, such as science and social studies, but in an academic way.

Plans for next year are an improvement over present program.

A fair degree of home cooperation is reported.

Type IV

Important areas of health knowledge, habits, and attitudes are emphasized. No undesirable emphases, such as poor mental hygiene, are evident.

Health is taught through natural classroom situations, but not through home and community situations.

Some examples of pupil initiative are presented.

Some examples are given of problem solving as an objective of health education.

Indication is given of child study and guidance with reference to individual pupils.

Some effort is made to study the environment and the needs of the group with a view to making desirable changes.

Interest in growth and immediate local problems is used as motivation for health instruction.

Significant evidence of results is presented in terms of pupils' growth in habits, attitudes, and knowledge.

Health values are related to other subject matter fields, and some evidence is shown of attention to health aspects of all school activities.

Good home cooperation is secured.

Plan for next year shows improvement and recognition of best features of the present plan.

Type V

Most important areas of health knowledge, habits, attitudes are emphasized, especially those relating to prevention of infection, to nutrition, and to good mental hygiene.

Emphasis may be put on any one of these in a given year.

Health is taught through real life situations.

Indication is given of excellent provision for pupil initiative and originality.

Pupils are taught methods of problem solving; i.e., how to solve health problems. They are not merely given a solution to a problem.

Indication is given of pupil's study of individual, home, and community problems.

Marked indication is given that teacher studies immediate and future health needs of individual pupils and makes provision for them.

Marked evidence is shown of the study of health needs of the group and the making of environmental changes.

Highest levels of motivation are used for social service, best individual development, satisfaction in activity itself.

Evidence is presented of excellent results in the acquisition of habits, knowledge, and attitudes.

Health education appears to permeate in a subtle way the entire school program.

Maximum of home cooperation is secured.

Plan for next year includes best aspects of present plan and certain new features.

This rating scale has been described in detail because of its value for self-rating. Teachers may be guided by it in evaluating their methods of teaching health. It may also serve as a stimulus to teachers to have in mind concretely the features of effective health instruction. Supervisors, too, may find this rating scale useful as a guide in evaluating teachers' health work and in helping them to perform this important task better. It would furnish excellent material for conferences with teachers.

Agreement of Raters. The reports demanded a good deal of reading between the lines. The three raters of the teachers' reports in this investigation showed individual differences in the leniency of their ratings. One rater, (A), gave the teachers "the benefit of the doubt" and sometimes, perhaps, read into their statements better practice than actually existed. Another rater, (B), though less generous in her interpretation of the reports, showed fair agreement with Rater A, and apparently followed approximately the same standards and had a similar point of view. The third rater, (C), on the other hand, gave a much less sympathetic interpretation of the teachers' statements and quite consistently rated them lower than either of the other two. Rater C, also was of the opinion much more

Rating	Percentage Distribution of Ratings				Number of Times Specified Rating Was Given			
	Total for 3 Raters	Rater A	Rater B	Rater C	Total for 3 Raters	Rater A	Rater B	Rater C
	Ratings for each of seven special phases of instruction							
Any Rating	100.0	100.0	100.0	100.0	5,376	1,792	1,792	1,792
−1	2.9	2.0	4.2	2.5	157	36	76	45
0	25.7	22.5	17.8	36.7	1,379	403	319	657
1	31.5	24.3	32.1	38.1	1,693	435	575	683
2	24.4	27.8	26.6	19.0	1,314	498	476	340
3	15.5	23.4	19.3	3.7	833	420	346	67
	Rating for each teacher on basis of total impression							
Any Rating	100.1	100.0	100.0	100.1	694	251	238	205
1	23.9	11.6	19.3	44.4	166	29	46	91
2	26.4	16.3	35.3	28.3	183	41	84	58
3	27.7	25.9	34.5	22.0	192	65	82	45
4	16.3	32.7	8.4	5.4	113	82	20	11
5	5.8	13.5	2.5	0.0	40	34	6	0
Not Rated						5	18	51

Table 3. Distribution of ratings on reports of health instruction by 256 teachers given by three raters for seven special phases of instruction and for total impression score.

frequently that there was too little evidence of the quality of teaching to enable her to give a rating.

It is of interest to examine in detail the use of the two rating scales by the three raters and the differences in their points of view. In rating on the seven separate phases of health instruction, Raters A and B agreed very closely, as may be seen in Table 3 and Figure 1. The average of their 1,792 ratings was 1.5 and 1.4; and the distribution of these ratings is very similar. The frequency of lower ratings by Rater C is clearly indicated in Figure 1. Out of the total of 1,792 ratings on specific items, there was perfect agreement on 444, or 25 per cent, but 249 of these 444 ratings were "O" or "no evidence" on the special items. However, two of the three ratings were in agreement for an additional 1,010 of the 1,792 ratings, or 56 per cent. Thus, the average rating of the three raters for specific phases and

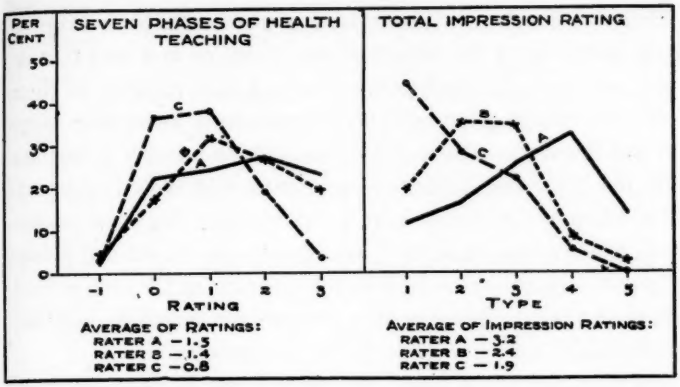


Fig 1. Percentage distribution of ratings on health instruction practice reported by teachers according to three different raters.

the composite rating based on these would seem to give a fair interpretation of the practices recorded.

The agreement on the total impression rating was less marked, since Raters A and B, as well as C, apparently had different standards or different points of view in using this rating scale. The scale was meant to be more flexible and to permit the rater to give credit for good instruction or practice relating to any part of the health teaching even though some specific phases were not well covered. The wide divergence of opinion of the raters is apparent in Table 3 and Figure 1. Rater A and B agreed on 28 per cent of the total impression ratings, but all three raters agreed on only thirteen, or 5 per cent. Each rater seems to have applied some standard consistently and the average result should provide a dependable basis for judging the comparative quality of health instruction in Cattaraugus County and the control group.

The failure of Rater C to give a total impression rating to thirty of the sixty-nine teachers in the control area, and twenty-one of the 187 teachers in Cattaraugus County presented some difficulties in determining an average total impression rating for the two groups

of teachers. However, it was decided to use the simple average of ratings given, using the ratings of two raters, or in a very few instances, one rater, for teachers who had not been rated by all three raters. The ratings given by C were consistently lower than those by A and B and the omission of C's rating for a number of teachers results in a somewhat higher average rating than would be expected if a rating by C were available for all teachers. Since the proportion of teachers not rated by C was greater in the control group, this group is especially favored by the omission of C's ratings for a number of teachers. The resulting comparison, therefore, indicates a minimum of difference between the two groups.

General Results of Rating. Average ratings for both the composite scores and the total impression ratings were definitely higher for Cattaraugus County teachers than for those in the control group, Steuben and Allegany Counties. The averages are shown in Table 4, which also indicates that differences of about the same amount between Cattaraugus and the control group were noted by each of the raters, although the general level of their ratings differed. The consistency of the findings by the three raters and the degree of difference noted give valid evidence that the teachers' accounts of their health teaching showed some phases of the practice in Cattaraugus to be better than that in the control group.

Table 4. Comparison of Cattaraugus County teachers and control group on basis of total composite rating and total impression rating.

Group	Average Rating		Average for Individual Raters					
	Composite Rating	Total Impression	Composite Rating			Total Impression		
			A	B	C	A	B	C
Cattaraugus County	9.7	2.7	11.3	11.2	6.7	3.4	2.6	2.0
Control Group	5.8	2.0	7.8	5.8	3.8	2.6	1.8	1.2
Number of Teachers:								
Cattaraugus County			187	187	187	184	171	166
Control Group			69	69	69	67	67	39

Rating	Cattaraugus County 3 Raters	Control 3 Raters	Cattaraugus County			Control Group		
			A	B	C	A	B	C
	Composite Rating							
Total	100.0	100.0	100.0					
−2	2.5	9.2	1.6	1.1	4.8	7.2	7.2	13.0
2–5	23.9	45.4	17.6	17.1	36.9	24.6	43.5	68.1
6–9	25.3	27.1	17.1	22.5	36.4	33.3	31.9	15.9
10–13	22.3	13.0	24.1	25.1	17.6	21.7	14.5	2.9
14–17	16.8	4.8	28.3	18.2	3.7	11.6	2.9	0
18–21	9.3	0.5	11.2	16.0	0.5	1.4	0	0
Number of Ratings	561	207	187	187	187	69	69	69
	Total Impression Rating							
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1	18.6	39.9	9.2	11.7	36.1	17.9	38.8	79.5
2	24.8	31.2	14.1	30.4	30.7	22.4	47.7	17.9
3	30.1	20.2	21.2	43.3	26.5	38.8	11.9	2.6
4	19.0	8.1	37.5	11.1	6.6	19.4	1.5	0
5	7.5	0.6	17.9	3.5	0	1.5	0	0
Number of Ratings	521	173	184	171	166	67	67	39

Table 5. Percentage distribution of composite ratings and total impression ratings for Cattaraugus County teachers and a control group.

The percentage distributions of the composite ratings and the total impression ratings for both Cattaraugus teachers and the control group, shown in Table 5 and Figure 2, indicate that many teachers in both areas appeared to be carrying on a very poor type of program. On the other hand, a considerable number of teachers in Cattaraugus County received ratings indicative of excellent health education, but in the control group no teacher was given the highest impression rating (5) by two of the raters and only one teacher received this rating from the third rater. Since no teacher was rated 5 by Rater C, there was no teacher in either group who had an average rating of 5.

When the composite scores are grouped into five classes, as in Figure 2, the percentage distribution shows a striking similarity to that for the five class impression rating. The higher percentage

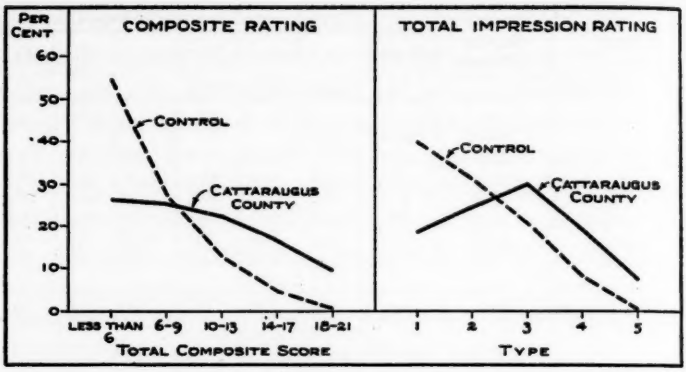


Fig. 2. Percentage distribution of total composite ratings and of total impression ratings by three raters for health instruction practices reported by teachers in Cattaraugus County and in a control area.

with very low composite scores than with the lowest impression rating arises from the fact that many of the teachers with the lowest composite scores received no impression rating from one or more of the raters. The composite rating equalled fourteen or more, out of a possible twenty-one, in 26 per cent of the ratings for Cattaraugus teachers compared with 5 per cent in the control group, and 27 per cent of the impression ratings for Cattaraugus teachers were Type 4 or Type 5, as against 9 per cent for the control group. Although these ratings show that many teachers in Cattaraugus County have taken little or no advantage of the special supervisory service, the average level of health teaching appears to be better than in the control group, and a larger proportion of the teachers in the County were giving a fairly high type of health instruction.

Specific Phases of Health Teaching. The ratings on the separate items for Cattaraugus County and the control group, Steuben and Allegany Counties, are given in Table 6. For each item, the Cattaraugus average rating was higher, but the difference between averages varied considerably. The highest average ratings in both groups were for the inclusion of important areas of health knowl-

Specific Items Rated[1]	Average Rating for Specific Items							
	3 Raters Combined		Rater A		Rater B		Rater C	
	Cattaraugus County	Control	Cattaraugus County	Control	Cattaraugus County	Control	Cattaraugus County	Control
Total Composite Rating[1]	9.73	5.81	11.32	7.81	11.17	5.80	6.71	3.83
1. Important Areas of Knowledge	2.04	1.41	2.32	1.87	2.26	1.28	1.56	1.09
2. Use of Real Situations and Problems	1.36	0.58	1.45	0.64	1.67	0.59	0.96	0.51
3. Attention to Individual Needs and Abilities, Initiative and Originality	1.13	0.75	1.43	1.30	1.54	0.84	0.41	0.10
4. Type of Motivation	1.26	0.23	1.48	0.41	1.32	0.14	0.98	0.14
5. Results in Terms of Habits, Attitudes, and Knowledge	1.75	1.25	2.08	1.71	1.88	1.14	1.27	0.90
6. Home Cooperation	1.21	.93	1.51	1.20	1.34	1.06	0.78	0.54
7. Plans for Next Year	0.99	.66	1.05	0.68	1.16	0.75	0.76	0.55

[1]Highest possible rating for items 1 to 7 is 3; and for composite rating is 21.

Table 6. Comparison of results of ratings for specific phases of the health education programs reported by teachers in Cattaraugus County and in a control group.

edge, habits, and attitudes, with 2.04 for Cattaraugus County and 1.41 for the control group. The highest rating possible for any of these seven items was 3. The item receiving the second highest average rating also was the same for both groups, namely, results in terms of habits, attitudes, and knowledge; the ratings were 1.75 and 1.25.

The greatest difference between Cattaraugus County and the control group was in types of motivation, with 1.26 average in Cattaraugus County and .23 average in the control group. Nearly as great a difference was shown in the use of real situations and problems, the average ratings being 1.36 and .58 respectively.

General Summary. The attempts to evaluate health education with precision are few in number. This effort to record and evaluate health instruction is a pioneer one. The attempt to formulate

significant aspects on which teachers may report, and to devise a rating scale by means of which the teachers' reports may be contrasted by impartial judges is a necessary first step.

The questionnaires used in this study brought forth no irrelevant answers from the teachers. There were, however, many incomplete answers which increased difficulties in making evaluations.

The rating scales which were used seemed to differentiate among the reports and to cover all the important kinds of information supplied by the questionnaires. The "general impression rating" made possible a total evaluation in which one exceptionally admirable feature could be given special weight, or a general impression of good teacher-pupil relationship could be given credit.

The results obtained by the application of the rating scale to the questionnaires returned by the two groups of rural teachers show quite clearly the value of the type of in-service education given to the experimental group. In regard to types of motivation used by the teachers the experimental group was rated as markedly superior to the control group. Apparently the education of teachers was especially effective in creating an awareness of the more desirable types of incentives to healthful living. In every respect, however, the experimental group was rated somewhat higher by judges who did not know the group to which the individual records belonged.

Although the results of this investigation are more favorable for the experimental group, which has had the advantages of special help in health instruction, they also point to the need for further in-service education of teachers in this group. If this is done, continuous improvement in the school health program of Cattaraugus County may be expected.

IMPAIRMENTS IN A RURAL POPULATION

by RALPH E. WHEELER, M. D.

II. HISTORY DATA[1]

ONE of the first steps in the medical examination of a patient is that of obtaining the personal history. The history findings to some extent determine the character of the physical and laboratory examinations which follow, and all three usually contribute to the final diagnosis. Rather startling physical and laboratory findings may lose all their significance in the light of facts ascertained by the history survey, and certain such findings otherwise regarded complacently achieve grave significance in that light. The usefulness of history-taking is not, however, confined to qualifying other medical findings; the diagnosis of such conditions as mental disorders, chronic constipation, and dysmenorrhea may rest almost wholly on the history, although it must be confessed that negative physical and laboratory findings are important aids. The clinic physician, however, is particularly dependent upon history in determining the impairment status of a patient because he does not often see his patient during the course of characteristic attacks of periodically recurring conditions, such as epilepsy, asthma, and urticaria (hives), and because he may not be able to include in his routine special examinations, such as vaginal and rectal examinations, to establish diagnoses such as uterine displacement or hemorrhoids.

It is evident from the partial enumeration of impairments given above that history data must be taken into account in any analysis of impairment status, but there are a number of reasons for presenting them separately. Such data, unconfirmed by more extensive studies, have the same limitations that other unsupported medical

[1] This is the second in a series of notes on the physical status of a rural population. The first appeared in the Milbank Memorial Fund *Quarterly* for July, 1937.

findings have. The emotions, education, and intelligence of the patient impose many qualifications upon the reliability of the information he furnishes, and histories should properly be evaluated with no little regard for these factors. Furthermore, the character of the history itself is important, for upon its completeness as well as upon the manner in which the patient is questioned, depends much of the value of this part of the examination.

History-taking together with evaluating is thus a highly individual process which does not lend itself readily to statistical study. It must also be confessed that routine clinic history recording necessarily falls somewhat short of the ideal discussed above. However, patients were questioned upon leading symptoms which, when affirmatively answered, were further analyzed by more detailed questioning, so that in many instances a definite diagnosis could be made. Furthermore, the patient was encouraged at several points in the history-taking to offer data upon any of his past or present chronic illnesses which had already been diagnosed, and the accuracy of these diagnoses was verified with some care by further questioning.

It is here proposed to outline the responses, first, to the leading symptom questions which will be presented as asked and which will include cases which were subsequently proven to have ample physical basis as well as those found to have only an apprehensive basis or none at all. Finally, the diagnoses obtained in the course of history-questioning, which could not be verified by the physical or laboratory examinations in the clinic, will be given. These will be discussed with due regard for the limitations of such data, and are presented with the conviction that, despite these limitations, they offer quite reliable approximations to true prevalence.

In both instances and in much of the later analyses the data will be presented for the true sample and for the total sample (which latter includes the former but also includes a limited number of cases seeking medical aid). The prevalence data for the true sample

will, despite its name, be an understatement because from it have been excluded a certain number which would ordinarily be included in a random sample, while the total sample figures probably overstate prevalence to some extent. Because the true sample forms the major part of the total sample, the rates for both will not in general be widely divergent. This method of presentation has two advantages: first, it establishes only the limits of a rate which in the last analysis can never be measured exactly; and second, the degree of divergence of the two rates will indicate to some extent the type of symptom or condition for which the patient seeks medical advice in a rural area.

The percentages of persons giving affirmative answers to questions upon leading symptoms are given in Table 3. With two

Table 3. Percentages of all examined persons in the true and total samples with various leading symptoms elicited by history-taking.

Symptom	Number With Given Symptom		Percentage Mentioning Symptom[1]		Percentage Mentioning Symptom, Standardized for Age and Sex[2]	
	True Sample	Total Sample	True Sample	Total Sample	True Sample	Total Sample
Dizziness	70	200	8.9	15.8	10.2	14.7
Headache	156	330	20.2	26.0	20.9	25.4
Frequent or Prolonged Colds or Coughs	130	266	17.4	21.7	17.9	21.8
Shortness of Breath	90	238	11.8	19.0	13.1	17.3
Cardiac Pain	47	134	6.1	10.5	7.0	9.9
Constipation	126	301	16.4	23.7	17.4	22.6
Periodic or Habitual Use of Laxatives	103	250	13.4	19.6	14.3	18.7
Abdominal Complaints	111	254	14.7	20.1	15.9	19.2
Frequent Urination	59	132	7.8	10.6	8.7	9.7
Difficult or Painful Urination	20	57	2.6	4.4	3.1	4.0
Chronic or Recurring Skin Trouble	39	95	5.1	7.6	5.2	7.7
"Rheumatic" Pains	128	277	17.4	22.5	19.5	20.7

[1]The crude percentage has, however, been corrected for sex because of the larger proportion of women in both true and total samples and because of the usually higher proportion of women mentioning many of these symptoms.
[2]Standardized to rural population, United States Census, 1930.

exceptions (indicated in the text) these were not counted as defects for reasons to be given below. They will, however, serve to show to some extent the prevalence of disorders, frequently minor and often within normal limits, of various systems of the body.

Some question naturally arises about the significance of the various complaints or symptoms detailed in Table 3. *Dizziness,* on further questioning, was usually found to be associated with sudden change of posture in elderly persons and, as such, was not an entirely abnormal finding. The few instances in which it proved to be of more definite character usually showed some physical finding which indicated its significance. *Headache* includes a few cases with migraine and other recognizable syndromes, but in general it was found to be difficult to determine the significance. *Frequent coughs and colds* were found to be a somewhat miscellaneous group. The association of this with upper and lower respiratory defects will be discussed at greater length in a subsequent analysis. *Shortness of breath* was most commonly encountered in obese patients and could thus be attributed primarily to that cause. It was, however, occasionally found to have a definite cardiac or pulmonary background. *Cardiac pain* is a symptom more often encountered than verified. Only one case gave a definite enough description of this pain on more detailed questioning to make the diagnosis of coronary disease highly probable. This proved otherwise a frequent complaint of neurotic persons of all ages.

Chronic constipation was a frequent complaint at all ages and is one of the few, in this section of the history-taking, counted regularly as an impairment. *Use of laxatives* is here seen to be a fairly prevalent custom, possibly from the old rural tradition of routine purging. *Abdominal complaints* constitute an important group whose basic causes were very difficult to determine. A more extended study of these may reveal some relationship to constipation, use of laxatives, dental status, and other factors.

Frequent urination and *painful urination* are both symptoms of

urinary tract disease. In general they were complaints of adults and may be useful as an index of the prevalence of urethral stricture and of chronic prostatitis in males, of disturbances following childbirth in females. Neither of these conditions, relatively common in elderly men and women, were otherwise covered by history-taking. *Chronic or recurring skin trouble* was usually seen at the time of eruption and as such will be discussed in a later note. However, five cases of urticaria were recorded—a recurring condition not often seen in the clinic but accurately enough described to be fairly easily identified. The condition is probably more common than this number would indicate but individuals failed to mention it when questioned. *Rheumatic pains* were acknowledged by a surprisingly large proportion of individuals; the term "rheumatic" is loosely used by the laity and indeed by the medical profession. The responses may therefore be somewhat unreliable even though the more obvious cases of misuse of the term have been omitted from the tabulation. It was originally included because it was felt that joint changes, particularly in early cases of arthritis, cannot be determined by physical examination as readily as by history. For this reason, the response, except when palpably inaccurate as indicated by further questioning, was considered along with constipation as an impairment. Others in this table were only so counted when some other basis was discovered.

The impairments ascertained solely from history at the clinic are presented in Table 4. In some cases they have been grouped in broad classifications where it is felt that more detailed diagnosis could not be made on the basis of the routine examination or where it was found that very small numbers resulted. From the cases and diagnostic groups in Table 4 have been excluded all cases showing physical or laboratory findings confirming or interpreting the history obtained. While this may seem a somewhat arbitrary division, it at least serves to keep distinct the unsupported history data from those in which more objective findings corroborated the diagnosis.

The discussion of the individual items in Table 4 may most conveniently be done under system headings.

Nervous System. Under this division are included impairments of the mind and nerves without other findings. Classically, the mental disorders are subdivided into *mental deficiency* (morons and idiots), *psychoses* (loosely termed "insanity"), and *psychoneuroses* (neurasthenia, hysteria, etc.). Of the three groups only the first and third were diagnosed at the clinic. Some of the examinees had a record of attendance at mental hospitals and some attended subsequently for disorders in the second group, but the diagnosis was not made with certainty on a single case at the time of examina-

Table 4. Percentages of all examined persons in the true and total sample with conditions diagnosed primarily on the basis of history.

Condition or Class of Condition	Number so Diagnosed		Percentage so Diagnosed[1]		Percentage Standardized for Age and Sex[2]	
	True Sample	Total Sample	True Sample	Total Sample	True Sample	Total Sample
Nervous System						
Mental Deficiency	10	14	1.3	1.3	1.3[3]	1.3[3]
Psycho-neurosis	20	55	2.6	4.2	2.4	4.1
Other	9	28	1.0	2.3	1.0[3]	2.0
Respiratory System						
Bronchitis	37	85	5.2	7.1	5.7	7.2
Asthma	7	15	0.9	1.0	0.9[3]	1.0
Gastro-intestinal System						
Hemorrhoids	36	132	4.7	6.2	5.2	5.8
Other	9	25	1.2	2.1	1.2[3]	2.0
Diseases of Women						
Menstrual[4]	3	14	1.7	5.1	1.8	5.3
Other[5]	5	10	1.3	1.5	1.2	1.6
Skeletal System						
Lumbago and Backache	37	56	4.9	4.5	4.2	4.4

[1]The crude percentage has, however, been corrected for sex because of the larger proportion of women in both true and total samples and because of the usually higher proportion of women mentioning these symptoms.
[2]Standardized to rural population, United States Census, 1930.
[3]Sex correction only, because of limited numbers.
[4]Percentages based on the number of women examined, aged 15–45 years only.
[5]Percentages based on the number of females examined only.

tion. An important limitation of the figures here given is that mental institutions undoubtedly contained, at the time clinic examinations were made, a certain number of individuals from the area studied who would otherwise have been part of a random sample. This may in part explain the absence of psychotic patients and the fact that, athough there were a limited number of morons, no idiots were seen.

The remaining classification under nervous system impairments contains for the total sample a number of less easily classified conditions, as follows: neuritis and neuralgia, fifteen cases; migraine, twelve cases; epilepsy, one case. The first of these comprises two diagnoses very frequently mentioned by patients but allocated to other classes on further questioning in all but the fifteen cases noted. Migraine, though probably not primarily a disease of the nervous system, is included here for convenience. Epilepsy was also more frequently mentioned in the history than verified by closer questioning. In most instances the convulsive states were found to be acute ones in infants and wrongly attributed by the apprehensive mother to epilepsy. The single case entered here appeared to have been definite. Another case with periodic unconsciousness but without convulsions was diagnosed as a possible mild epileptic, but the diagnosis considered uncertain enough not to warrant inclusion. A third individual, with periodic seizures but with definite physical findings attributed to an old head injury, had what is sometimes termed "traumatic epilepsy" and will be discussed in the proper place. These cases with actual physical findings of nervous system disease were very few. Possibly the addition of a careful neurological examination would have extended the findings somewhat. In general, however, the detection of nervous system impairments in a routine clinic examination is largely a matter of careful history-taking, and extensions in this direction would seem more profitable than extensions of the physical examination.

Respiratory System. The nose, throat, bronchi, and lungs were carefully explored by physical examination and X-ray so that an objective basis was obtained for all but two diagnoses. The first of these, bronchitis, is said to be diagnosed more often than it actually occurs, so that it is with some trepidation that data on it are offered. No acute cases were included, but the prevalence figures suggest that subacute as well as chronic bronchitis make up the total. The other diagnosis, asthma, is represented by relatively few cases. This is a condition which varies somewhat in its prevalence from locality to locality and figures from another area might differ from those reported here. One other impairment should perhaps be included here—hay fever. This condition was usually not mentioned in history except when the person had it at the time of examination. It illustrates one of the limitations of history diagnosis as practiced at the clinic, namely, that minor impairments—even when handicapping as hay fever often is—are not spontaneously mentioned but have to be sought out quite carefully.

Gastro-Intestinal System. Except for inspection of the mouth and teeth, the diagnoses on this system were almost wholly made from history and many impairments were probably discounted because of the difficulties of making an accurate diagnosis upon this basis alone. The figures for *hemorrhoids* may be low, even in the total sample, as it seems probable that this condition is recognized and mentioned less often than it actually exists. Among *other conditions* for the total sample are six cases of chronic or recurring diarrhea diagnosed as colitis, and one case of gastric ulcer. The remainder of those cases which appeared troublesome enough to warrant impairment status in this subdivision (eighteen in all) were tentatively diagnosed as post-operative adhesions or chronic appendicitis.

Diseases of Women. The figures here refer primarily to particularly troublesome cases as the history was not framed to include this group of very prevalent impairments. Among *menstrual dis-*

orders for the total sample are included eleven cases of dysmenorrhea, one of amenorrhea, one of irregular menses, and one of menorrhagia. Leukorrhea, including one case previously diagnosed as having gonorrheal vaginitis, made up the total under the heading of *other* in this section.

Skeletal System. Most orthopedic impairments were fairly readily diagnosed on the basis of physical findings; however, a very troublesome group of lower spine complaints is to be found in the history division. A definite diagnosis was not attempted, and the complaints, when sufficiently localized, were grouped in this way.

The percentages in Table 3 are high in part because, as indicated above, they include a number of individuals whose symptoms are, all things considered, within normal limits. They also include a good many cases in which definite organic derangements were detected. The relatively small number who were found, on further questioning, to have defects diagnosed by history alone are also largely included in Table 3. However, the high percentages of this table indicate that there are many more persons with various mild disorders (some of which are psycho-neurotic) than can be diagnosed by a quite careful physical examination alone.

The percentages in Table 4 are of significance because they were obtained with more detailed sifting of the above data and because they include specific conditions whose prevalence is more often given as an estimate than as a result of medical observation.

TING HSIEN AND THE PUBLIC HEALTH MOVEMENT IN CHINA[1]

by C. C. CH'EN, M. D.[2]

THE year 1936 was very troublesome in North China. The unfavorable political situation, combined with natural internal developments, brought about a new policy in the Mass Education Movement. In the first place, the programs worked out in Ting Hsien needed to be tested for their applicability in other parts of the country. In the second place, certain other aspects of a reconstruction program, particularly in connection with the reorganization of the local government and its functions, could not be carried out under the conditions existing in Hopei Province. In the third place, while hsien-unit administration is sound as a basic principle, there are many aspects of a hsien-unit program which cannot be effective unless the province is taken as the unit.

Accordingly, in July, 1936, the Movement embarked on a new policy of expansion. The request of the authorities led to the establishment of two new provincial stations in Hunan and Szechuan. The program in Hunan is mainly cooperation with the Provincial Government in the administration of an Experiment Hsien. A province-unit experiment is being conducted in Szechuan, under the auspices of a "Provincial Planning Commission," which also conducts an Experiment Hsien. Thus the Movement now maintains three stations: one in North China (Ting Hsien), one in Central China (Hengshan), and one in West China (Chengtu and the Hsintu Experiment Hsien). In 1936, the author was appointed director of the Ting Hsien Station of the Mass Education Movement.

[1] With some condensation, this is the annual report of the Department of Public Health of Ting Hsien, Hopei, China, written a month before the present outbreak of hostilities in China.

[2] Head, Division of Public Health, Chinese National Association of the Mass Education Movement, Ting Hsien. This Division has received financial assistance from the Milbank Memorial Fund since 1929.

Because of its facilities for training, Ting Hsien will continue to be a vital part of the Mass Education Movement. The present nation-wide activities of rural reconstruction under both governmental and private auspices demand a large supply of trained personnel. For some years to come the Government will have to depend upon private institutions to supplement its training of personnel, and the Mass Education Movement, which was the first organization in the field and the first to develop a program with a comprehensive approach, has a rich amount of available experience for dealing with special problems of agrarian life and reform. The senior staff of the Movement is probably the best qualified in the country to impart the necessary knowledge and technique. Moreover, effective teaching requires field facilities in addition to a competent staff, and the organization at Ting Hsien is generally recognized as distinctly original and qualitatively superior to similar developments in many parts of China. It is therefore the policy of the Movement to conserve and expand the technical developments in rural reconstruction at Ting Hsien, so that it will continue to be a center of specialized training under the auspices of the Movement.

By the end of 1936, several assistants in the Department had become responsible administrators in governmental units of rural health service. Dr. Li Fang-Yung was appointed Chief of the Rural Health Division in the Kiangsi Provincial Health Service. Dr. Hsu Shih-Chu achieved marked success in the Kiangning Experimental Hsien (near Nanking) as its county medical officer. The work of Dr. Hou Tse-Ming, who has become the county health officer at Hua Hsien, Shansi, was commented upon favorably by Dr. A. Stampar, who was appointed by the Heath Organization of the League of Nations to conduct technical studies and furnish expert advice to the National Economic Council of the Government. More recently, Dr. Chiang Mao-ch'ing has occupied the post of county health officer at Henshan, Hunan. Dr. Li Chuan-ch'eng was sent to Szechuan to act for the writer on the Planning Com-

mission of the Szechuan Provincial Government, and has made an extensive survey of rural medical problems in that province. All of these individuals have been paid from government funds and today have much greater financial resources at their command than have ever been available for the parent experiment at Ting Hsien.

The governmental authorities in Kiangsu Province gave the first real political recognition to the rural health movement, providing a budget of about $40,000[3] for the work in the Kiangning Experiment Hsien. Quite recently, the Director of the National Health Administration announced that the Executive Yuan approved the budgeting of 5 per cent of hsien government expenses for the promotion of health, and fifty-two out of sixty-three hsiens in Kiangsu Province have initiated some organization for the application of modern medicine. The rural health budget of Kiangsu Provincial Government in a period of three years has increased from about $100,000 to over half a million. The Province of Kiangsi, one of the poorest in China, is providing a budget of $300,000 for the development of hsien health services.

ACTIVITIES IN TING HSIEN IN 1936

The Collection of Vital Statistics. Health officers in this country are afraid of statistics, because there is not an economical machinery to collect the most elementary information. In one or two places, special inspectors have been trained and employed, but they prove extremely expensive, thus affecting the vital issue of continuity. There are no registrars such as those found in Western countries, and the police organization extends only to the big market towns.

Attempts to collect information on births, deaths, and certain causes of mortality, which were started in Ting Hsien in 1932 through the village health workers, have proved fairly successful. The registration area increased from a population of about 400 in 1932 to 170,000 in 1936. The number of reports (births and deaths)

[3] Monetary figures are based on Chinese currency, which is approximately one-third the value of United States currency.

	1934	1935	1936
Population Under Registration	22,600	103,000	170,000
Crude Birth Rate	27.4	25.9	25.1
Crude Death Rate	27.2	29.1	20.4
Infant Mortality	163.1	185.2	145

Table 1. Crude birth rate, death rate, and infant mortality in Ting Hsien, 1934-1936.

increased from 791 in 1933 to 7,742 in 1936. The data gathered in 1934, 1935, and 1936 are analyzed in Table 1. It is hard to say which year's figures are most accurate, but, in spite of the rapid increase in the number of registering villages, the results are reasonably constant. The decline in the crude death rate in 1936 may be partly due to the absence of any severe epidemics such as the epidemics of scarlet fever and dysentery in 1935, and a comparison of the age

Table 2. Age distribution of deaths in the registration area of Ting Hsien, 1935-1936.

Age	Number of Deaths		Percentage	
	1935	1936	1935	1936
Total	2,997	3,475	100.00	100.00
0- 1	494	522	16.48	15.02
1- 4	839	629	27.99	18.10
5- 9	308	301	10.28	8.66
10-14	83	88	2.77	2.53
15-19	60	93	2.00	2.68
20-24	74	118	2.47	3.40
25-29	66	113	2.20	3.25
30-34	73	88	2.44	2.53
35-39	40	73	1.33	2.10
40-44	57	86	1.90	2.47
45-49	48	84	1.60	2.42
50-54	112	177	3.74	5.09
55-59	64	127	2.14	3.66
60-64	139	207	4.64	5.96
65-69	110	161	3.67	4.63
70-74	171	208	5.71	5.99
75-79	90	174	3.00	5.01
80-89	144	204	4.81	5.87
90 and Over	25	22	.85	.63

distribution of deaths reported in 1935 and 1936 (Table 2) seems to bear out this impression. The largest decrease in percentage of total number of deaths occurs in the 0-9 age groups and the decrease is most marked in the preschool age group.

Specific death rates for the three-year period are shown in Table 3. It will be noted that the death rates from certain of the controllable diseases, such as smallpox and rabies, remained persistently low in each of the three years. In 1936, there was a marked drop in mortality from gastro-intestinal infections, particularly dysentery and diarrhea and enteritis under two years, and the death rate from

Table 3. Specific death rates in the registration area of Ting Hsien, 1934-1936.

Cause of Death	Specific Death Rate per 100,000 Population		
	1934	1935	1936
Typhoid Fever	9	25	21
Typhus Fever	18	2	10
Dysentery	102	230	53
Smallpox	4	10	3
Plague	0	0	0
Cholera	13	12	1
Diphtheria	44	55	79
Epidemic Cerebral Meningitis	18	9	7
Scarlet Fever	31	653	151
Measles	44	62	46
Purulent Infections	84	74	78
Rabies	4	0	1
Other Infections and Parasitic Diseases	119	104	111
Convulsions	84	111	118
Puerperal Conditions	31	23	28
Tuberculosis of the Respiratory System	208	178	141
Respiratory Diseases	49	154	160
Diarrhea and Enteritis (Under 2 Years)	75	200	30
Disease of the Digestive System Not Otherwise Specified	173	157	156
Cardio-renal Diseases	159	149	118
Senility and Apoplexy	239	318	270
Congenital Debility and Premature Births	66	39	51
Poisoning and Suicide	27	19	23
External Causes	93	28	41
Other Causes	27	89	121
Ill Defined Causes	22	107	48

scarlet fever decreased to one-fourth the figure for 1935, although it is still very high. The death rate from tuberculosis of the respiratory system has shown a steady decline. The reason for this decline is obscure, although it might be partially credited to the relative economic prosperity of the area in 1936. Lastly, in spite of the lack of accurate diagnosis, the mortality from certain uncontrollable causes, such as the cardio-renal diseases, senility and apoplexy, diseases of the digestive system not otherwise specified, and purulent infections, is surprisingly constant—which possibly might be added to the credit of the method of collecting the data.

The death rates for tetanus neo-natorum and kala-azar were 62 and 25 respectively. Trained midwives delivered 18.1 per cent of the births in the City of Tinghsien in 1936, with no deaths from tetanus neo-natorum, while there was a rate of 8 per cent among the deliveries made by local untrained women. Cases of kala-azar are treated with ureastibamine, and the cost of each course of treatment has been reduced to about four dollars.

Inasmuch as registration is only one of the functions of the village health workers, and the analysis of the reports requires only a full-time clerk under the direction of the physician in charge of communicable disease control, the cost of collecting vital statistics in Ting Hsien can be reduced to a minimum. Roughly, each report, including the analysis, costs about ten cents.

Communicable Diseases. Work on communicable disease control is being carried on in many parts of China, but most of the health officers are not sure whether any preventive technique may be applied extensively under rural conditions and whether any disease is controllable. After four years of organized efforts in Ting Hsien, there are proofs that smallpox vaccination may be carried on economically on an extensive scale and that the disease can be kept reasonably under control. At Ting Hsien, the number of persons vaccinated against smallpox has been steadily increasing each year, and in 1936 reached one-seventh of the population. The

increasing percentage of primary vaccinations is even more significant (Table 4), because it shows that the vaccinations are being given to those most in need. Over 50 per cent of the primary vaccinations were of children under one year, and the percentage of primary vaccinations of children under three years increased from 66.9 per cent in 1933 to 83.4 per cent in 1936. Only 5 per cent of the primary vaccinations last year were given people over ten years of age, and only about 12 per cent of the total were third or fourth vaccinations.

As reported before, difficulties in vaccinating girls and women, especially adolescents who are ashamed of exposing their arms to a vaccinator, are very great. However, the percentage of females vaccinated in Ting Hsien increased from 20.1 per cent of the total in 1930 to 37.1 per cent in 1936. The tradition against vaccination in the autumn is also breaking down. In 1932 only 196 vaccinations were made during the autumn campaign, while in 1936 there were 6,335.

The effectiveness of the technique this year was found to be 95.3 per cent, showing that the work was qualitatively satisfactory. The cost was 2.2 cents per vaccination, each primary vaccination costing 7 cents.

Diphtheria inoculations of one injection of alum precipitate toxoid were given 1,282 preschool children, and 1,084 school children were Schick tested. Over fifty per cent of the 450 children found to be Shick-positive were immunized.

Table 4. Percentage of previous vaccinations against smallpox among the vaccinated in Ting Hsien, 1933-1936.

Year	Never Been Vaccinated	Vaccinated Once	Vaccinated Twice	Vaccinated Three Times or More
1933	22.4	61.8	11.9	3.9
1934	28.6	52.5	13.4	5.5
1935	29.1	48.5	14.8	7.6
1936	31.1	56.7	8.5	3.8

Medical Relief. Public health work in this country includes medical relief, because the public demands it and satisfactory medical relief is far beyond the economic reach of Chinese farmers. There are three possible approaches to the problem. The first is to limit all treatments of diseases to clinic service, which is unsatisfactory because of the limited service which can be provided. The second alternative is to concentrate on institutional treatment. This is the policy of most of the missionary hospitals in the country, but it too makes medical relief available to only a small portion of the population.

The third possibility is to discriminate between the quantitative and qualitative types of medical care. An analysis of 15,701 treatments given by the village health workers in Ting Hsien disclosed that 60 per cent were for minor skin infections and 27 per cent were for eye infections. Obviously, there is a great demand for the proper use of simple antiseptics. In 1936, the 151 village health workers gave 200,755 of these minor treatments, each treatment costing less than one cent. In addition, the physicians at the subdistrict health stations gave 56,671 treatments and attended 13,168 new patients. 29.8 per cent of 2,277 cases studied were suffering from skin infections and 27.3 per cent had eye infections, the other cases being chiefly parasitic diseases, surgical conditions, and respiratory diseases. In other words, over fifty per cent of the treatments given at the health stations were for conditions quite similar to those treated by the village health workers. The cost per treatment at the subdistrict health station clinics last year was about 6.5 cents, including the expense for drugs. These treatments given by the village health workers and the general practitioners at the subdistrict stations are quantitatively significant, inexpensive, and meet the needs of the general population to a considerable degree.

The cost of operating the District Health Center Hospital (forty-five beds) in 1936 was $22,380.77. This cost cannot be further reduced without seriously affecting the quality of the service. Calculated

on the basis of 614 admissions and 12,807 patient days in 1936, each new admission cost about $36.45 and each patient day $1.74. Two hundred and seventy-two operations were performed, 7,567 diagnostic examinations of all kinds were made in the hospital laboratory, and 207 outcalls made by members of the hospital staff.

Forty-five beds are not sufficient for a population of 400,000, but in view of the cost of hospitalization and the limited amount of personnel capable of handling services of qualitative superiority, it is questionable whether plans for larger hospitals in a district or hsien are practical in this generation. A hostel for convalescing patients is being considered in Ting Hsien, which may help to reduce the cost of hospitalization.

Public Health Nursing. In comparison with bedside nursing, public health nursing is new to the medical profession in China. The results of public health nursing are often rather intangible because of their educational nature; public health nurses, because of additional training, are generally more expensive than bedside nurses; and the majority of these nurses have been trained in metropolitan areas and so are not fitted for work under rural conditions. Therefore, unless an administrator is fully convinced of the educational value of public health nursing, he is usually inclined to confine nursing to the bedside care, especially for surgical conditions. On the other hand, the solution of social problems in China depends mainly on educational work, and, since medical services are strategic channels for such educational activities, it seems illogical for the health officer to omit public health nursing from his program.

Since 1932, the Health Department in Ting Hsien has been seeking to develop a public health nursing program in the experimental area. There follows a summary of the activities carried on by the nurses in Ting Hsien in 1936:

School Health. Seventy primary schools and a girls' normal school, with an enrollment of 5,882 children, were put in charge of four public

health nurses and a half-time supervisor. These nurses gave about 320,000 minor treatments, principally for trachoma, tinea of the scalp, dental defects, and discharging ears. As a result, 25 per cent of the 3,172 cases of trachoma were practically cured by the end of the year and 30 per cent showed improvement; 67 per cent of the 360 cases of tinea of the scalp were almost cured; 168 children had had their serious dental defects corrected; and of 129 cases of discharging ears under treatment 38 per cent had been cured. The cost per treatment was negligible. The nurses also vaccinated 1,855 children against smallpox, inoculated 248 boys against typhoid, and gave one injection of diphtheria alum toxoid to each of 300 children. With some technical assistance from a sanitary inspector, forty-six school latrines and thirty-nine school wells were improved at the expense of the schools.

Health Education. The nurses and teachers gave 2,337 talks to the school children; nurses held 1,768 individual conferences with the teachers; and the school health corps assisted in the discussion of sanitary problems at 118 meetings. 15,509 free baths were given the children.

In cooperation with the Department of Education of the Movement, a series of teaching guides in 200 lessons has been developed and is being tested in the experimental primary schools of Ting Hsien. A special grant from the Rockefeller Foundation has also made possible the production of adequate material for the ordinary primary schools. Emphasis is laid on health habits in the first two grades, physiology in the third grade, and community health in the fourth.

The adult training class held in 1936 had an enrollment of forty women from twenty-one villages. The objectives of the course are: (1) to understand woman's place in social improvement; (2) to cultivate desirable attitudes and habits of healthful living; and (3) to acquire useful knowledge and technique for the enrichment of home life. Personal hygiene, animal husbandry, gardening, handicraft, recreation, literacy, and citizenship, were taught, the schedule being arranged so that most of the time was occupied by activities rather than by classroom lessons. Each week-end an excursion was arranged to local socio-economic institutions. Most important, by coming to the class these farmers' wives were obliged to live a different life than that to which they were accustomed. After four weeks of strict discipline, they seemed to have found that to live better does not necessarily mean spending much more

money, and in some cases they have made astonishing improvements in their homes.

Maternity and Infant Health. For the past year a public health nurse has had charge of the maternity and child health work at the District Health Center, with promising results. During the year she made 571 visits to antenatal and postnatal cases and attended sixty cases of normal labor and, with the assistance of a physician, four cases of difficult labor. She conducted a mother's club for twenty-three women and ten of them completed a full course of sixteen meetings.

Field Training of Technical Personnel. While the Central Health Administration at Nanking has devoted a great deal of its resources to the training of health officers, there are at least three ways in which the Health Department at Ting Hsien can supplement the service offered by the Central Government: first, through the provision of facilities for a course of field training for students who have completed a six-months' course at Nanking; second, through field training courses for under-graduate students at the medical colleges and, third, through the training of public health nurses. Twenty-seven third-year students of the Peiping Union Medical College observed the work at Ting Hsien last year, and three fourth-year students each spent one month at Ting Hsien, participating in the activities at the District Health Center and the subdistrict health stations. Beginning with 1937, internes at the Peiping University Medical College will each spend two months in Ting Hsien, one month at the District Health Center and the second at a health station. The course at the Hopei Provincial Medical School was lengthened to six years in 1936, and the field teaching of public health shifted to the interne year. Consequently, there were no students from the School at Ting Hsien last year.

In 1935, six graduate nurses were enrolled for the training course in public health at Ting Hsien, seven more students were enrolled in 1936, and plans are being made to enlarge the enrollment to fifteen next year.

ANNOTATIONS

THE SOCIAL COMPONENT IN MEDICAL CARE: A STUDY OF ONE HUNDRED CASES FROM THE PRESBYTERIAN HOSPITAL IN THE CITY OF NEW YORK[1]

To determine more accurately the part played by social influences in the development of ill health, in the progress of curative measures, and in the adjustment to chronic disease, is the primary aim of the studies recorded in THE SOCIAL COMPONENT IN MEDICAL CARE. Two kinds of social factors are especially considered: (1) those affecting the patient's subsistence or survival, and (2) those affecting his satisfaction with his place and part in life.

The hundred cases forming the basis of this analysis were selected as alternate ward patients admitted over a period of seven and a half months to the Presbyterian Hospital. They represented chiefly a group of young and middle-aged persons (fifty-six males), largely English-speaking American citizens, cared for in the usual way by members of the professional staff of the hospital, assisted by the customary technical and adjunct services. Two workers were added to the social service staff to assemble the social data and to carry out the social treatment. Protected from undue pressure of routine duties, they were able to secure as full and reliable information as possible, and to discuss it point by point with the physicians.

Detailed case histories are cited under the various classifications of cases grouped by prognosis and diagnosis. Fourteen were classed as acute, twenty-four as recurrent, forty-nine as chronic, eight as chronic-terminal, and five without organic diseases. These histories are followed

[1] Thornton, Janet (in collaboration with Marjorie Strauss Knauth, M.D.): THE SOCIAL COMPONENT IN MEDICAL CARE: A STUDY OF ONE HUNDRED CASES FROM THE PRESBYTERIAN HOSPITAL IN THE CITY OF NEW YORK. New York, Columbia University Press, 1937. 411 pp. $3.00.

by descriptions of adverse social factors associated with individual problems of ill health affecting subsistence and satisfaction. Sickness and disability experienced by forty-nine patients appeared to be caused solely by organic diseases, chiefly infections, malignant growths, and metabolic disturbances. Evidence in forty-seven other cases (data for four incomplete) made it appear likely, though not always certain, that social factors led to physical strain, deprivation, or dissatisfaction which may have contributed to the development of disability.

While serious organic damage was found in forty of these patients and was regarded as the major cause of their disability, it appeared probable that in twenty-three this organic damage was accelerated or intensified by strain of deprivation. In eight, strain resulting in chronic fatigue, or deprivation resulting in malnutrition, or a combination of these lowered resistance and may have influenced the onset of disease. The following comment is noteworthy regarding twenty-two diseased patients: "We mean here explicitly that these dissatisfied patients had less energy available to spend, and wasted much of what was left in their disease-impaired organisms, because of dissatisfaction, as a result of which they were sicker patients than others equally or even more damaged by disease."[2]

Unfavorable social factors were more frequently relevant to the health problem in the groups of recurrent and chronic cases than in the acute. Of course, the hospital resources are especially designed for patients in acute stages of disease and such care in the hospital helps to forestall social problems in the home or prevents them from complicating the problem of care for the sick person. Rapidity of onset and termination of the disease with early return to normal functioning lessens liability that adverse social factors may play a large part in prevention of recovery. On the other hand, recurrent and chronic cases are characterized by more prolonged disability, and by need of a greater degree of adjustment

[2] Frequency of unfavorable social factors thought to have affected development of disability in forty-seven instances:

Undue Effort to Earn Subsistence	30
Inadequacy of Means	21
Habits Unfavorable to Maintaining Health	19
Lack of Satisfying Social Status	15
Unfavorable Habitat and Locality	14
Incompatibility and Friction	11
Inadequate Shelter	11
Lack of Satisfying Work	10
Lack of Personal Service	6
Lack of Satisfying Recreation and Sociable Life	6

involving adverse influences from the patient's personality and his social environment, become more significant in the medical problem.

While social factors have been previously recognized as important in relation to medical care, the formulation of procedures has not been as complete for a thorough exploration of the social make-up as of the organic make-up. By use of the case method for the teaching of medical and nursing students in a few institutions, attention has been directed to the social aspects of medical care, and the complexity of chronic social conditions has been revealed while also observing chronic disease conditions. But the implications of many social influences have not been fully recognized or understood.

From the standpoint of the medical practitioner, it may be observed that this distribution of types of cases represents a hospital ward cross-section rather than a community-wide picture of social problems which may complicate the medical care of cases observed outside of the hospital wards. Conclusions drawn, however, are highly valuable as additions to the knowledge derived from medical social work, and from considerations of the various causes of depletion of body substance, fatigue and emotional tension. These manifestations seem of special importance in aggravating disability already started by organic disease. Adverse social factors thus apparently have significance in medical care chiefly because of their power to disable; and the claim is made that these factors expressed as deprivations, strains, and dissatisfactions have physiological effects. Convincing evidence is given that disability can be decreased by controlling adverse social factors affecting individual patients. For sound future development, it is urged that more accurate and concise terms be invented for expressing social factors and remedial measures, and that such terms come to be the habitual mode of expression of all who engage in the social work of medical institutions.

IRA V. HISCOCK[3]

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THE CONTROL OF PNEUMONIA

THE final report of the Pneumonia Study in Massachusetts[1] conducted from January 1, 1931 to the end of 1935 by the Department of Public Health should be of interest because the control of pneumonia is becom-

[3] Yale University School of Medicine.

[1] Heffron, Roderick and Robinson, Elliott S.: Final Report of the Massachusetts Pneumonia Study and Service, 1931-1935. *The Commonhealth*, January-March, 1937, 24, No. 1.

ing an essential part of the public health program. The pneumonia study had two objectives, the evaluation of pneumonia serum under the conditions of the general practice of medicine, and the development of plans for the distribution of the serum for the treatment of those patients who might reasonably be expected to benefit from its use.

The important findings of the study are:

(1) *Epidemiological.* . . . Epidemiologic studies were made of cases, carriers, and contacts. Typing was carried out through most of the higher types, and for the first time it was clearly shown that, of all the types, only Type I and Type II were of special epidemiologic significance. Type I was found twenty times as prevalent in immediate family contacts of Type I cases as in the population at large, and Type II ten times as prevalent in its contacts. Investigation of cases showed that about 20 per cent of family contacts with Type I or II cases became carriers of these types, while only about 2 per cent of hospital contacts became carriers of such types. It was found that some factor in addition to contact alone was needed to determine the transfer of Type I or II pneumococci from patients to contacts, and this factor appeared to be the presence in such contacts of upper respiratory infections such as the common cold. Persons with colds in contact with Type I or II cases were likely to become carriers of these types, and the carrier state might persist for weeks.

(2) *Educational.* Efforts were made to acquaint physicians with the newer information available regarding pneumococcus typing, serum concentration and its relation to dosage, and the technic of treating patients with serum. Graduate courses, many special meetings, chiefly symposiums, and District Medical Society meetings were held in nearly all parts of the State to present these matters to the profession and to acquaint them with the pneumonia program.

(3) *Clinical.* During the first three years of the study, seventeen especially selected areas were organized for intensive work. In these, typing was done in twenty-eight hospitals by thirty especially trained technicians, and serum was available through seventy-eight collaborators in these areas. In addition, there were eight hospitals in Boston from which serum was available, and typing was done in seven of these. This organization served approximately one-half the population of the State.

A thorough investigation of the various methods of typing was made. The important result of this was that the Neufeld method was

found simple, rapid, and accurate, and was advised as a routine method of typing.

In 1934 it was obvious that by the end of the study in 1935, if the State took over the production and distribution of serum, it would have to be equally available to all physicians . . . and that . . . the distribution of the serum dispensed should be restricted for use only in early Type I and Type II cases. By the end of 1935 serum was equally available to all physicians in the State through the State Bacteriologic Laboratory and eight hospitals in Boston, as well as from fifty-seven hospitals outside Boston, making a total of sixty-six depots in all.

Records of 956 cases of lobar pneumonia treated with Type I and Type II anti-serum were analyzed and the results showed conclusively that serum can be used successfully by physicians in general practice. A comparison of the fatality rate of the treated cases with the expected fatality rate of cases of the same type not receiving serum indicated a saving of the lives of eighty-nine patients.

Undoubtedly this experiment in pneumonia control in Massachusetts is of great interest to other communities.

JEAN DOWNES

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COMPARATIVE MORTALITY OF PATIENTS DISCHARGED FROM TUBERCULOSIS SANATORIA

THE importance of more adequate rehabilitation including continued medical supervision for the tuberculous patient after a period of sanatorium care is strikingly indicated by the rate of survival of such patients for the immediate years after discharge. Dr. H. E. Hilleboe has rendered a service to those interested in tuberculosis control in assembling the post-sanatorium mortality experience of various classes of cases from studies using suitable control populations for comparison.[1] The studies which he discusses particularly are drawn from the Midhurst Sanatorium and the Brompton Sanatorium in England, the Adirondack Cottage Sanitarium (later Trudeau Sanatorium), and the Metropolitan Life Insurance Company's Sanatorium, both in New York State.

[1] Hilleboe, H. E.: The Comparative Mortality of Patients Discharged from Tuberculosis Sanatoria. *The American Review of Tuberculosis*, December, 1936, xxxiv, No. 6.

Life table methods of analysis were employed in all of these studies and the ratio of actual to expected deaths was used to measure the force of mortality. The various studies showed remarkable agreement and the conclusions which were drawn from the studies are as follows:

1. A person with minimal tuberculosis has his risk of dying increased approximately four times; moderately advanced, sixteen times; and far advanced, forty times over that of persons in the general population from which the patients were drawn.
2. Females with minimal disease did not experience as high a mortality rate as males of the same class (except in the Metropolitan study); however, the females with far-advanced disease were more severely affected.
3. The age, classification of disease on admission, and condition on discharge were important variables to be considered in aftermortality.
4. The length of residence was an important factor, particularly in the minimal and moderately advanced cases.
5. The presence or absence of tubercle bacilli in the sputum on admission and discharge had a markedly noticeable effect on the aftermortality.
6. The stage of the disease on admission of the patient was a more potent factor in the future survivorship than the fact that his antecedents were tuberculous.
7. The excess mortality was highest during the first two years after discharge, and increased in amount with the severity of the disease.

Dr. Hilleboe rightly feels that "this mortality experience of discharged patients is of practical importance to physicians, administrators, employers, insurance companies, and social service workers who assume the responsibility of rehabilitation." Certainly the problem of tuberculosis control is not entirely solved by securing sanatorium care for the tuberculous; for, as the author points out, the urgent need for universal provision of adequate medical supervision of discharged tuberculous patients is only too obvious in view of the excessive high mortality experiences.

Perhaps of more importance even than the assembling of the mortality experience of post-sanatorium patients is the fact that Hilleboe indicates the need for better and more practical use of data on tuberculosis cases; data which are easily available in the sanatoria throughout the country

and which can be used for the study of fundamental questions concerning tuberculosis which remain largely unanswered. Furthermore, he draws attention to the relatively simple method of statistical analysis, that of converting observations on patients to terms of life experience, which can be used with great flexibility in comparative studies of the problems associated with tuberculosis mortality. His clear and comprehensive discussion of the factors or variables which must be carefully considered in evaluating mortality among tuberculous patients is important and should be most helpful to those interested in the study of tuberculosis.

JEAN DOWNES

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TO TITLES OF ARTICLES AND AUTHORS IN THE MILBANK MEMORIAL FUND QUARTERLY

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